

INTERCEPTION OF COOK INLET-BOUND SOCKEYE
IN THE 1988 KODIAK COMMERCIAL SALMON FISHERY

AN IN-SEASON MANAGEMENT PERSPECTIVE

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by

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ABSTRACT

Cook Inlet bound sockeye migrate through Kodiak Area waters in unknown proportions. Varying levels of interception of these sockeye by Kodiak salmon fishermen has historically occurred. Generally, the interception has been at insignificant levels in relation to the total sockeye harvest for both Kodiak and Cook Inlet areas, however during a portion of the 1988 salmon season Kodiak fishermen intercepted Cook Inlet sockeye at a record level.

In-season biological concern for this interception resulted in the designation of a primary intercept area and time period. An emergency order closure of this "Intercept Area" was initiated during the "Intercept Period", but was quickly superceded by an emergency order reopening of this area when the original biological concerns were no longer considered valid after additional stock assessment in Cook Inlet.

The Kodiak industry's concerns with the closure were the potential loss of traditional fishing area and the loss of fish quality by a closure they considered more allocative than biological in basis.

This report deals with an in-season management perspective of the 1988 interception of Cook Inlet-bound sockeye. An associated report by Bruce Barrett, Westward Region Research Biologist, deals with a post-season analysis of this interception and is titled "North Shelikof Strait 1988 Sockeye Catch, Distribution, Timing, Stock Composition and Probable Impact"; that report is Regional Informational Report No. 4K88-6.

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WESTWARD REGION
KODIAK FINFISH MANAGEMENT AREA
SHELIKOF STRAITS SOCKEYE INTERCEPTION
1988 IN-SEASON PERSPECTIVE

KODIAK MANAGEMENT AREA DESCRIPTION

Boundaries

The Kodiak Management Area comprises the entire Kodiak Island archipelago and that portion of the Alaska Peninsula which drains into Shelikof Straits between Cape Douglas and Kilokak Rocks at Imuya Bay. The archipelago is approximately 200 miles long, extending from Shuyak Island south to the Trinity Islands. The Alaska Peninsula portion is about 300+ miles long and is separated from the archipelago by the Shelikof Straits which average 45+ miles in width (figure 1, page 15).

Management Units

Kodiak salmon management is structured around seven (7) districts subdivided into fifty-two (52) sections. These management units are occasionally further subdivided in-season by emergency order to adjust fishing effort on unexpected salmon surpluses or deficits. Each management unit defines a traditional geographical harvest unit managed for specific in-unit stocks and/or traditional fishing patterns associated with these units. (figure 1, page 15).

Streams

Of the 353 salmon streams in the Kodiak Area, 36 support sockeye populations of extremely varying size, 4 support viable chinook populations, approximately 90 support coho populations, approximately 110 have productive chum populations, and the entire set of 353 have documented spawning pink populations. These salmon streams are distributed as follows throughout the area: 73 occur in the Alaska Peninsula portion (Mainland District), and the remaining 280 occur in the archipelago; the number of streams by Island group places 184 on Kodiak Island, 66 on Afognak Island, 18 on Shuyak Island, and 12 on the Trinity Island group.

Salmon production is of the greatest diversity, magnitude, and stability in the archipelago primarily because of a favorable combination of stream morphology and maritime climate; Mainland District production is heavily influenced by harsher climatic conditions associated with Bering Sea weather patterns.

Stock Status

In evaluating the health of a management area's commercially targeted salmon stocks, the degree to which annual harvest trends relate to potential average maximum production should be addressed.

In recent years, the Kodiak Area has been experiencing excellent production similar to that observed in the adjacent Chignik and Cook Inlet Management Areas. As shown in figure 2 on page 16, the average annual harvest by species in Kodiak during the past thirteen years has equalled or even slightly exceeded average production levels.

Positive trends in achieving desired escapement requirements for all salmon species are apparent in figure 3 on page 17. This has been a major factor in achieving the production levels shown in figure 2 on page 16.

Local sockeye production has not yet fully recovered from the decimation which occurred early in this fishery's history, (figure 4, page 18); recent sockeye production trends (13 year average) are, however, very positive compared to prior trends. From a management perspective, current levels of Kodiak salmon production can be reliably maintained, that is, annual oscillations in production should be more directly related to environmental fluctuations than management-induced oscillations. Applying consistent management practices to achieve enlightened escapement requirements ensures this.

Industry Status

Since the disastrous years of the early 1970's, an increasing trend in harvest stability has prevailed (figure 5, page 19). An aggressive approach has been taken by Kodiak's salmon industry to secure this stability by providing broad support for ADF&G management and Board of Fisheries regulatory requirements and by creating a salmon enhancement assessment on their annual production (Kodiak Regional Aquaculture Association). The economic importance of salmon to all of the communities in the Kodiak Area is well recognized by industry. Kodiak's salmon production has been the principal reason that the port of Kodiak has been one of the nation's leading seaports in recent years. Current industry participation in the salmon fishery involves thirteen (13) shorebased plants in the Kodiak Area and 524 units of seine and gillnet gear; Additionally, during the 1988 season three outside-area processors operated in Kodiak as did a record 100+ tenders.

Management Status

In-season management actions are structured to adhere to a generalized plan described in an annually issued "Harvest Strategy". This strategy recognizes a specific chronology of management actions related to salmon run timing by species as shown in figure 6 on page 20.

Sockeye stocks are managed whereby targeted time and areas open to fishing for surplus sockeye depend upon system-specific criteria detailed in the "Harvest Strategy". Specific sockeye fisheries are initiated by daily evaluation of run strength. The primary sockeye management tool is the "fish-weir". Approximately 95% of Kodiak's sockeye escapement is documented via weir counts. Total escapement data is derived from hand-tallying daily escapement; electronic enumeration is not used. Actual daily escapement data is compared to desired daily escapement goals and if the comparisons are favorable fishing-time results. Sockeye fishing time is generally not pro-rated by pre-season

forecasts; this approach is applied to pink and chum salmon management. As shown in figure 6 on page 20, Kodiak sockeye stocks are divided into early (June 9 - July 15) and late (July 16 - September 15) run components and each has specific management considerations. Fisheries on early-run stocks are more stock-specific in that they generally occur with very little incidental harvest of other salmon species. Late-run stocks, however, are heavily impacted by pink and chum fisheries which result from targeted management during the period July 6-September 5.

Pink and chum stocks are widespread throughout the area, as previously mentioned, comprising approximately 80 - 85% of Kodiak's annual salmon production. Pinks are considered the "bread and butter" species because the magnitude of pink production provides the economic base for Kodiak's diverse and highly efficient salmon fleet. Management objectives for pinks and chums, aside from achieving escapement requirements, emphasize a consistent approach at preserving traditional harvest opportunities for both fixed and mobile gear as well as for the two mobile gear types (beach seine and purse seine) and for the variety of purse gear (limited seiners, medium-sized seiners, jitneys, etc.). Overriding these considerations is the problems associated with providing harvest opportunities for all permit holders on the highest quality fish. This can be difficult for pinks and chums because of their tendency toward rapid loss of quality once they've been exposed to in-shore waters.

The primary management tools for these two species are the pre-season forecast from which fishing time is pro-rated, the aerial surveys used to evaluate forecast accuracy by comparing in-shore "build-ups" and progressive escapement, and the daily harvest data from tender reports. A pre-season "harvest strategy" which specifies fishing-period scenarios and emphasizes that because of the aforementioned allocation and quality considerations, depicts the first three fishing periods occurring prior to total evalua-

tion of run strength. Fishing time and open areas are based upon the pre-season forecast and are "fine-tuned" as the peak harvest period is approached and reached during the fourth and fifth fishing periods. The actual wording in the 1988 Kodiak Area "Harvest Strategy" for this scenario is shown in figure 7 on page 21. This has been the standard management approach in the Kodiak Area since the disastrous salmon production years of the early 1970's and it has evolved into a fairly intense level of management as shown by the complexity of fishing time generated during the 1988 season in figure 8 on page 22; fishing time, in hours, by management unit is depicted by dark horizontal bars.

Pink salmon quality has greatly benefited from this approach. Currently Kodiak pink salmon enjoy an excellent reputation for quality; a necessary criteria considering the importance of today's frozen products. However, in the mid to late 1970's during the rebuilding of Kodiak's pink stocks, an ultra-conservative management approach designed to accelerate pink production to historical levels in one or two cycles resulted in significant quantities of low-quality pinks being harvested annually. Kodiak pink salmon gained the reputation for being among the lowest quality in the state. A major reason for this was the lack of fishing time prior to July 15; additionally fishing time between July 15 and the average peak date of August 4 was generally minimal. When pink production recovered in an unexpectedly rapid manner, in-shore build-ups of excessive pinks were dealt with by in-season adjustments (reductions) in closed water areas and increased fishing time during post-peak fishing periods. Again the end result was poor quality fish. This problem is emphasized in figure 9 on page 23 which depicts the average daily pink and chum harvest since 1970. It shows that approximately 24% of the annual pink harvest occurs during the first three fishing periods (July 6 through July 25) of the pink season; this is a significant proportion of the average annual pink harvest. Consequently, a change in Kodiak's management approach evolved into the scenario described in the preceding paragraph. The key

changes were to provide fishing periods which were initially pro-rated on forecast expectations and which began early enough and were extensive enough to provide a steady removal of in-shore bound pinks while quality was at it's greatest. In conjunction with this, the post-peak fishing periods became more important in achieving escapement requirements. This approach has yielded near-maximum production of high quality pinks. Figure 10 on page 24 depicts daily harvest levels for all species in 1988, a year when pink run timing was 5+ days later than average and it emphasizes the importance of the aforementioned management approach. It also depicts the proportional contribution of each species to the daily harvest during the pink and chum management period (7/6 - 9/5).

Coho stocks are managed similar to late run sockeye stocks in that significant levels of coho are intercepted in the pink and chum fisheries (figures 6 and 10 on pages 20 and 24), especially during years of high pink abundance. However, as with sockeye, achieving adequate escapements requires recognizing the extent of this interception in-season and then managing the terminal stock-specific harvest areas accordingly. This approach seems to be working well in that coho escapement and harvest has stabilized at historically high levels (figures 2 and 3, pages 16 and 17).

1988 COMMERCIAL SALMON FISHERY

Brief Overview

The 1988 Kodiak Area commercial salmon fishery can be characterized as a record year in terms of total ex-vessel earnings and average earnings by gear type. Additionally, management activities can also be characterized as being exceptionally successful in that escapement requirements were adequately achieved for all species, pre-season harvest projections were attained and/or exceeded for all species as shown below, and resulted in improved confidence and support of in-season management practices by industry.

	<u>Kings</u>	<u>Reds</u>	<u>Coho</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
Projected	4,000	1,800,000	150,000	15,250,000	1,000,000	18,204,000
Actual	22,000	2,699,000	303,000	14,559,000	1,426,000	19,009,000

This season was also noteworthy in terms of user group harmony; the traditional aggravation between fixed and mobile gear was at its lowest level in over a decade. The two board approved allocation plans, the Cape Igvak fishery plan, and the Alitak District fishery plan, both worked extremely well per the biological and allocative requirements detailed in each plan. The two other allocative plans in effect, both of which have tentative board approval, also worked extremely well; these two plans are the Westside Kodiak fisheries plan and the Kitoi Bay hatchery plan. Implementing these plans and other actions required the issuance of 24 in-season emergency orders which affected fishing time in 52 management units, as shown in figure 8 on page 22.

The 1988 commercial salmon season was 124 days in duration, extending from June 9 through October 10, the dates of the first and last landings. During that time period a total of 524 permit holders (322 purse seine, 180 set gillnet, and 22 beach seine) made 19,402 landings, to a total of 16 processors (15 shorebased, 1 floater) which yielded a total harvest of 19,009,000 salmon and a total ex-vessel value of approximately \$94,000,000. This was an all time record value for each of the species and for each of the gear types.

Daily harvest levels and harvest timing for each species are depicted in figures 10 through 12 on pages 24 through 26. A harvest breakdown by species and by fisheries, comparing projected vs. actual harvests, is listed in table 13 on page 27.

Shelikof Straits Sockeye Interception

During portions of the 1988 Kodiak Area commercial salmon fishery, Cook Inlet-bound sockeye were intercepted at a record level (figure 14, page 28). In-season daily harvest data indicated above average volumes of sockeye being harvested during the first three fishing periods of the pink and chum season (7/6 to 7/25) (figures 12 and 15, pages 26 and 27) henceforth denoted as the "intercept period". While the occurrence of these migrant sockeye was generally widespread, the primary harvest area was identified as being portions of the northern Shelikof Straits (figure 16, page 30) henceforth denoted as the "intercept area". The daily sockeye harvest in this "interception area" was proportionally significant to the sockeye harvest in the remainder of the management area during this "intercept period" (figure 17, page 31).

As previously indicated, fishing time during this "intercept period" for most portions of the management area is based upon pink and chum salmon management considerations, as detailed in "The 1988 Pre-season Harvest Strategy" (figure 7, page 21). These are the targeted management species for several of the geographically-associated management units shown in figure 18 on page 32; Specifically, Areas 1, 2, 3, 6, 7, 8 and 9 are targeted for pink and chum management from July 6 through September 5. Areas 2 and 3, while targeted for pink and chum management, generally include significant harvests on south-bound sockeye destined for major systems located in Areas 4 and 5. Areas 4 and 5 must consider a blend of sockeye and pink management during this time period because of the fact that 85% of the Kodiak Area's sockeye production originates from these Areas. Also Areas 5 and 10 have Board approved management plans dealing with specific harvest strategies, namely the Alitak Bay District and the Cape Igvak management plans respectively. Area 1 is the "intercept area", as defined above, and while the targeted managements species are pinks and chums, the primary harvest

species during the "intercept period" in 1988 was sockeye. This deviated significantly from the sockeye harvest which occurred in 1987, a year of record Cook Inlet sockeye production (6.7 million harvest) and above average Kodiak sockeye production (figure 20, page 34). An overview of the entire 1988 Kodiak sockeye harvest by geographical area for the intercept period (7/6 - 7/25) as well as the pre- and post-intercept period (6/9 - 7/5 and 7/26-9/5 respectively), is depicted in figure 21 on page 35. It further emphasizes the relative significance of the "intercept area" during the "intercept period" on interception of Cook Inlet-bound sockeye in 1988.

As the high level of sockeye harvest became apparent early in the "intercept period" and as it became more obvious that non-local sockeye were involved, concern was expressed from Cook Inlet by both industry and ADF&G that this interception would jeopardize escapements into the weaker Cook Inlet sockeye systems; the Susitna stock was identified as such a stock by the Upper Cook Inlet ADF&G staff.

In-season discussions between Kodiak and Cook Inlet ADF&G staff reviewed both the Cook Inlet and Kodiak salmon harvest strategies and the management scenarios which had been, were being, and would be occurring during this "intercept period". It was initially decided that the Shelikof Interception effort was of a magnitude that Susitna-bound sockeye could be intercepted at levels significant enough to impact escapement. Consequently, the Kodiak staff was directed to utilize their knowledge of this interception, and, in consideration of the harvest requirements on local Kodiak stocks, to develop a closed-water area which would yield the greatest reduction in Cook Inlet-bound sockeye interception with a minimal impact on the harvest of quality local pink and chum stocks and local sockeye stocks. This resulted in an emergency order being issued which identified the "intercept area" as the primary area where Cook Inlet-bound sockeye were being impacted and which closed this area effective

at 12:00 Noon, Monday July 18 to commercial salmon fishing. Concern by Kodiak industry that this E.O. closure was more allocative than biological in nature, created considerable discussion between all interested parties. Concurrently, the on-going process of run-strength evaluation being conducted by Cook Inlet ADF&G staff, was indicating that the Susitna stock was probably stronger than originally assessed and the dominant Kenai River stock was possibly going to exceed pre-season expectations. Consequently, because of changes in Upper Cook Inlet harvest strategies to accommodate this reassessment of run strengths and because the original biological concerns no longer applied, an emergency order was issued which reopened the "intercept area" to accommodate the original Kodiak harvest strategy for pink and chum stocks in that area, effective at 6:00 P.M. Monday, July 18. The actual harvest by species in the "intercept area" during the "intercept period" is depicted in figure 19, page 33).

It should be emphasized that the "intercept area" and "intercept period" identified in this report represent the area and time period of greatest interception of non-local sockeye from an in-season management perspective which utilized deviations from expected harvest levels by species, average sockeye weights and number of landings (figures 22 and 23, pages 36 and 37), and C.P.U.E. data (figure 24, page 38). A post-season perspective, i.e. a post-season summary of final harvest, escapement, and age-weight-length data is presented in another report by Bruce Barrett, Westward Region Research Biologist. In his report, he identifies a modified "intercept area" and "intercept period" based upon a post-season analysis of Cook Inlet sockeye stock contribution to the Shelikof sockeye interception fishery; See Regional Data Report 4K88-6. An estimate of the total interception of Cook Inlet-bound sockeye is presented in Table 13 on page 27 (see footnote in table); This figure should represent a maximum interception level for the entire Kodiak Area during the 1988 season.

As indicated earlier, interception of Cook Inlet-bound sockeye by Kodiak fishermen occurred in record numbers. The question of availability of these stocks to Kodiak fishing effort should emphasize the inconsistency of this interception. As depicted in figure 19 on page 34, the 1988 sockeye harvest during the "intercept period" in all of the geographically-associated harvest areas was greater than in 1987 which was a record year for Cook Inlet sockeye production (figure 14, page 28). This is significant for not only the "intercept area" but also for the S.W. Afognak section, Areas 1 and 2 in figure 19 on page 34; this latter section is included as part of Bruce Barrett's "intercept area" in his research report on the Shelikof interception issue, R.D.R. No. 4K88-7.

Availability of these sockeye in significant numbers to Kodiak fishing effort appears to require the combination of at least five (5) conditions, all of which occurred for the first time in 1988:

1. A large volume of Cook Inlet bound sockeye migrating through Kodiak Area waters.
2. Abnormally favorable weather conditions which made these sockeye available in record numbers.
3. Presence of a large, efficient, knowledgeable, and highly mobile seine fleet.
4. Adequate fishing time to discover high yield fishing locations on these sockeye.
5. Adequate area open to fishing to optimize fishing effort.

Regarding these factors and beginning with the latter two, fishing time and area open to fishing were based upon the projected strength of the 1988 Kodiak pink and chum salmon returns, as it always has been (figures 5 and 25, pages 19 and 39). The seine fleet size has remained fairly stable in recent years, but their fishing pattern changed in 1988 whereby approximately half of the active fleet was targeting selected areas in northern Shelikof Straits in a manner heretofore unseen, i.e. record gear levels, record landings and a fishing pattern which had seines being fished for northbound fish. Weather conditions were extremely favorable for all sized vessels

to fish in their most efficient manner. The prevalence of flat calm weather conditions allowed seine gear to be worked almost continuously during the open fishing periods both at traditional hook-hauling capes and offshore. Catch-per-unit effort levels were favorable enough that waiting in line at the traditional capes was no longer necessary. Fish distribution gave the impression that broad ribbons of surface-running north-bound sockeye were available throughout the northern Shelikof Straits. Daily sockeye availability seemed to be dramatically influenced by changes in wind conditions. Commonly boats moved back and forth across Shelikof Straits depending on wind conditions favorable to "setting" fish into windward capes. Likewise many vessels elected not to move with changing wind conditions as C.P.U.E. levels remained adequate for them; sockeye availability was widespread. As previously mentioned, the composition of catches for the Northern Shelikof during the "intercept period" was dominated by sockeye while the targeted management species, pinks in the Afognak Area and chums in the Mainland Area, were being harvested at a level secondary to the normal incidental species, sockeye (figure 20, page 34). This was dramatically inconsistent with historical harvest data for these areas as shown in figure 26 on page 40.

1989 SALMON FISHERY

Brief Preview

The 1989 Kodiak Area salmon harvest should be above average for all species but overall not as productive as the 1988 season:

Harvest	Kings	Reds	Cohos	Pinks	Chums	Total
1988 Actual	22,000	2,698,000	303,000	14,559,000	1,426,000	19,009,000
1989 Projected	5,000	2,500,000	200,000	10,500,000	800,000	14,005,000

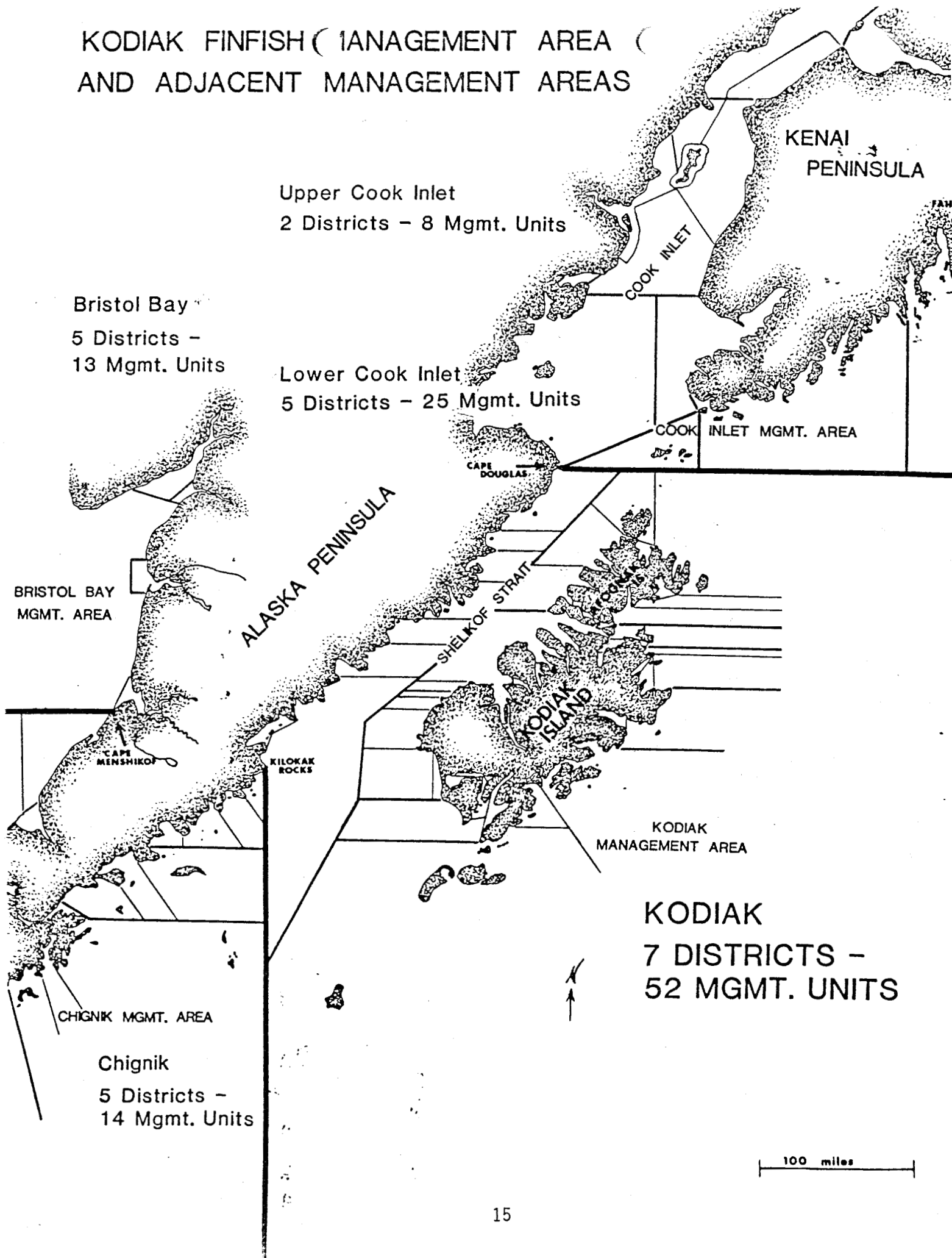
Harvest strategies that reflect traditional harvest scenarios for all species will be detailed in the "1989 Kodiak Area Harvest Strategy" to be issued in May 1989. Geographically-associated harvest areas will continue to be managed per fishery-specific management plans, some of which are Board approved (regulatory) and some of which are not. The latter are identified as "tentative management plans" and reflect management patterns designed to achieve adequate escapements while providing consistent harvest opportunities, and hence more orderly fisheries, for all gear types. Fishing time and areas open to fishing during the pink and chum season, 7/6 - 9/15, is expected to be similar to what occurred in the parent cycle year, 1987 (figure 25, page 39).

Shelikof Straits Sockeye Interception

Historically, interception of Cook Inlet sockeye by the Kodiak salmon fleet was first documented by a 1928 tagging study. Subsequent tagging studies have almost always indicated the presence of Cook Inlet bound sockeye in Kodiak Area waters. Interception levels on these sockeye by the Kodiak salmon fleet over the years have been insignificant. They were not targeted but were caught incidental to targeted Kodiak bound sockeye, pinks and chums; again, this is depicted in figure 14 on page 28. In recent years, when Cook Inlet stocks have been at record levels of production, the numbers of large bodied north-bound sockeye appearing in Kodiak's commercial salmon catch has noticeably increased. Knowledge of these fish occurring in certain broad geographical locations at certain time periods has spread throughout the fleet, primarily the mobile seine fleet. The increasing, but annually unpredictable, trend in sockeye catch-per-unit-effort for vessels fishing the "intercept area" has merited interest by other seiners in the Shelikof fishery scenario (figure 24, page 38). Whether or not this interception will increase while Cook Inlet production oscillates downward is unknown. However, when considering the insignificant level of interception which occurred in 1987, a record production year for

Cook Inlet sockeye stocks (figure 14, page 28), it appears that interception of those sockeye in significant portions, at increased rates, in Kodiak waters is entirely dependent upon the previously mentioned five factors associated with Shelikof interception.

KODIAK FINFISH MANAGEMENT AREA AND ADJACENT MANAGEMENT AREAS



KODIAK MANAGEMENT AREA
Salmon Production^{1/} Potential vs. Actual
(MILLIONS OF FISH)

SPECIES	PRODUCTION POTENTIAL			HARVEST		
	Desired Escapement	AVERAGE		POTENTIAL	ACTUAL	
		Return Per Spawner	Total Return		107 Year Period (1882-1988)	13 Year Period (1976-1988)
KING	.015	2.0	.030	.015	.002	.004
RED	1.600	2.5	4.000	2.400	1.000	1.900
COHO	.150	2.0	.300	.150	.080	.160
O. ^{2/} PINK	2.000	4.0	8.000	6.000	7.700	7.000
E. ^{3/}	3.900	4.0	15.600	11.700		12.000
CHUM	.600	3.0	1.800	1.200	.700	.900
O. ^{2/} TOTAL	-	-	-	9.800	9.500	10.000
E. ^{3/}	-	-	-	15.500		15.000

1/ Natural Production

2/ O. = Odd Numbered Years

3/ E. = Even Numbered Years

12/2/88

KODIAK MANAGEMENT AREA
HISTORICAL INDEXED SALMON ESCAPEMENTS BY SPECIES^{1/}

YEAR	CHINOOK	SOCKEYE	COHO	PINKS	CHUMS
1962	-	922,500	-	4,600,000	297,900
1963	-	502,227	-	1,026,075	75,520
1964	-	600,346	-	3,360,000	261,429
1965	-	561,980	-	772,874	67,156
1966	-	652,578	-	2,100,000	143,700
1967	-	720,683	-	698,710	136,079
1968	703	645,612	-	2,800,000	121,000
1969	7,752	592,020	-	1,581,335	77,285
1970	3,900	573,603	-	3,392,577	123,150
1971	4,524	456,197	-	1,070,173	249,327
1972	3,049	605,491	-	1,053,391	335,115
1973	4,762	543,111	-	604,592	258,044
1974	1,622	995,925	-	2,041,099	86,383
1975	3,059	704,801	-	1,100,555	156,761
1976	8,411	1,075,226	-	3,105,320	312,914
1977	13,824	1,269,374	59,095	2,212,488	742,384
1978	14,677	1,000,353	37,479	5,006,273	482,956
1979	14,441	1,410,800	94,000	3,067,647	607,430
1980	5,850	1,831,748	28,000	6,492,822	830,070
1981	15,720	1,391,593	59,000	3,188,869	741,981
1982	10,773	1,603,692	86,000	5,370,049	1,023,923
1983	27,445	1,300,506	104,000	2,089,704	824,954
1984	14,429	1,467,780	123,000	4,512,124	682,936
1985	13,876	2,574,539	191,417	3,168,197	727,883
1986	11,046	2,001,279	170,000	4,068,615	655,817
1987	23,744	1,551,543	153,000	2,978,510	641,579
1988 ^{2/}	35,000	1,900,000	105,000	4,400,000	720,000
Average	14,600 ^{3/}	1,102,220 ^{3/}	95,199 ^{3/}	2,809,704 ^{4/}	689,000 ^{3/}
=====					
Odd Year Average (1963-1988)				1,812,287 ^{5/}	
=====					
Even Year Average (1962-1988)				3,735,867 ^{6/}	

^{1/}Indexed escapement represents total indexed escapement by species as determined by summations of peak abundance estimates for the set of species-specific streams investigated each year. For all species except chums this will include totals summed from both actual weir counts and from aerial/foot estimates. For the data set shown, errors associated with this type data compilation do not detract from depicted trends.

^{2/}Preliminary as of 11/28/88

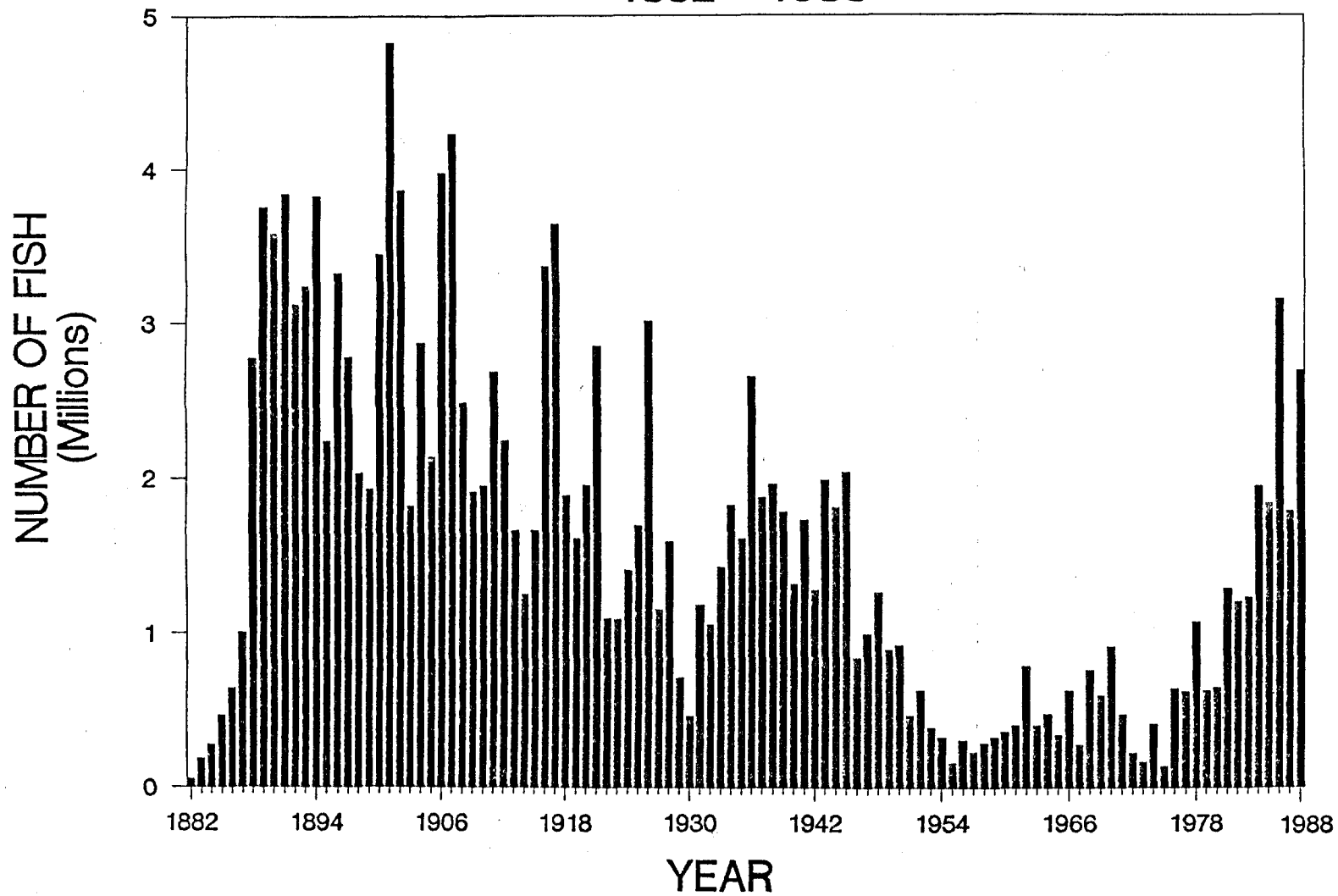
^{3/}12 year average (1976-1987)

^{4/}26 year average (1962-1987)

^{5/}13 year even year average (1962-1986)

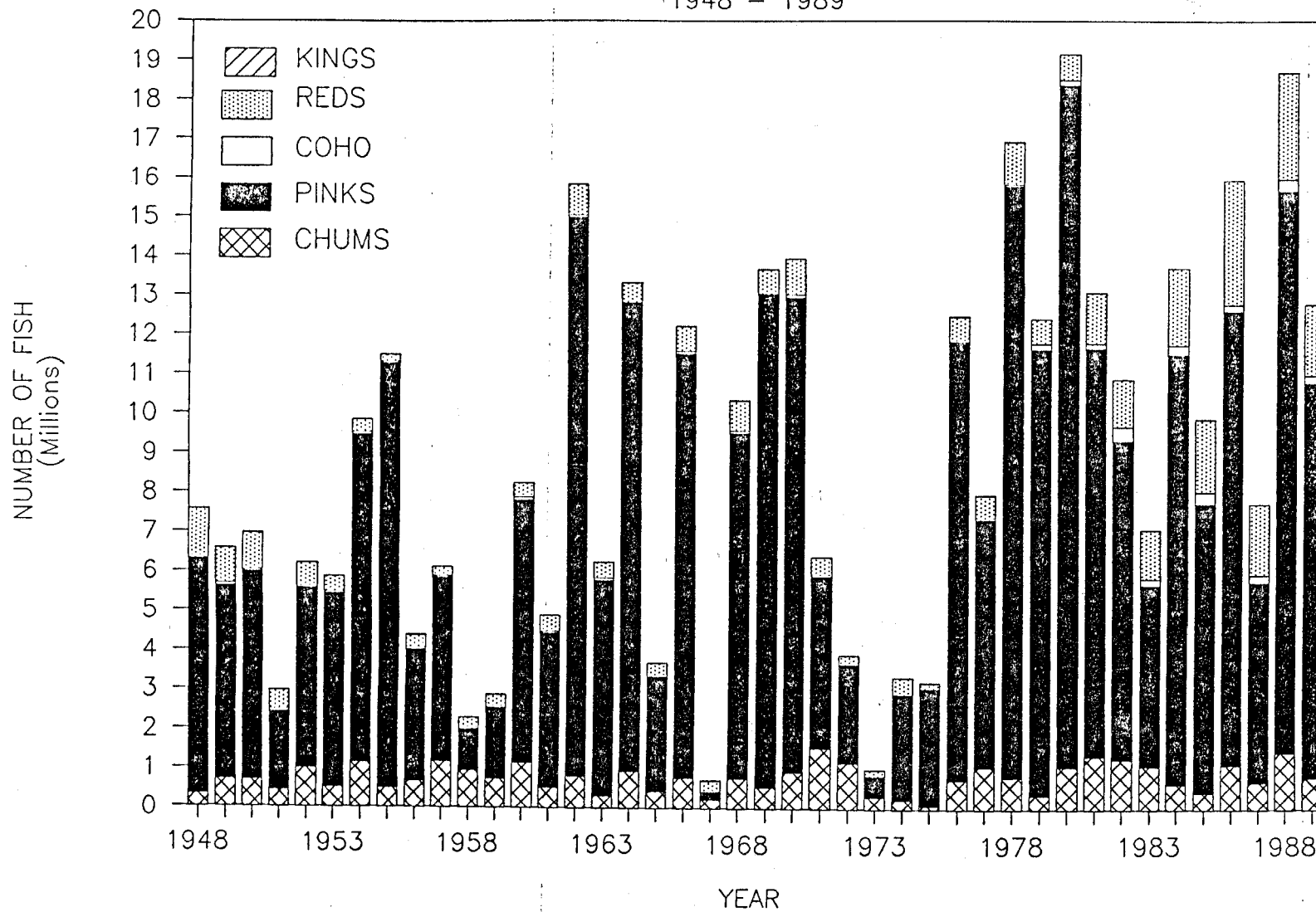
^{6/}13 year odd year average (1963-1987)

KODIAK MANAGEMENT AREA HISTORICAL SOCKEYE HARVEST 1882 - 1988

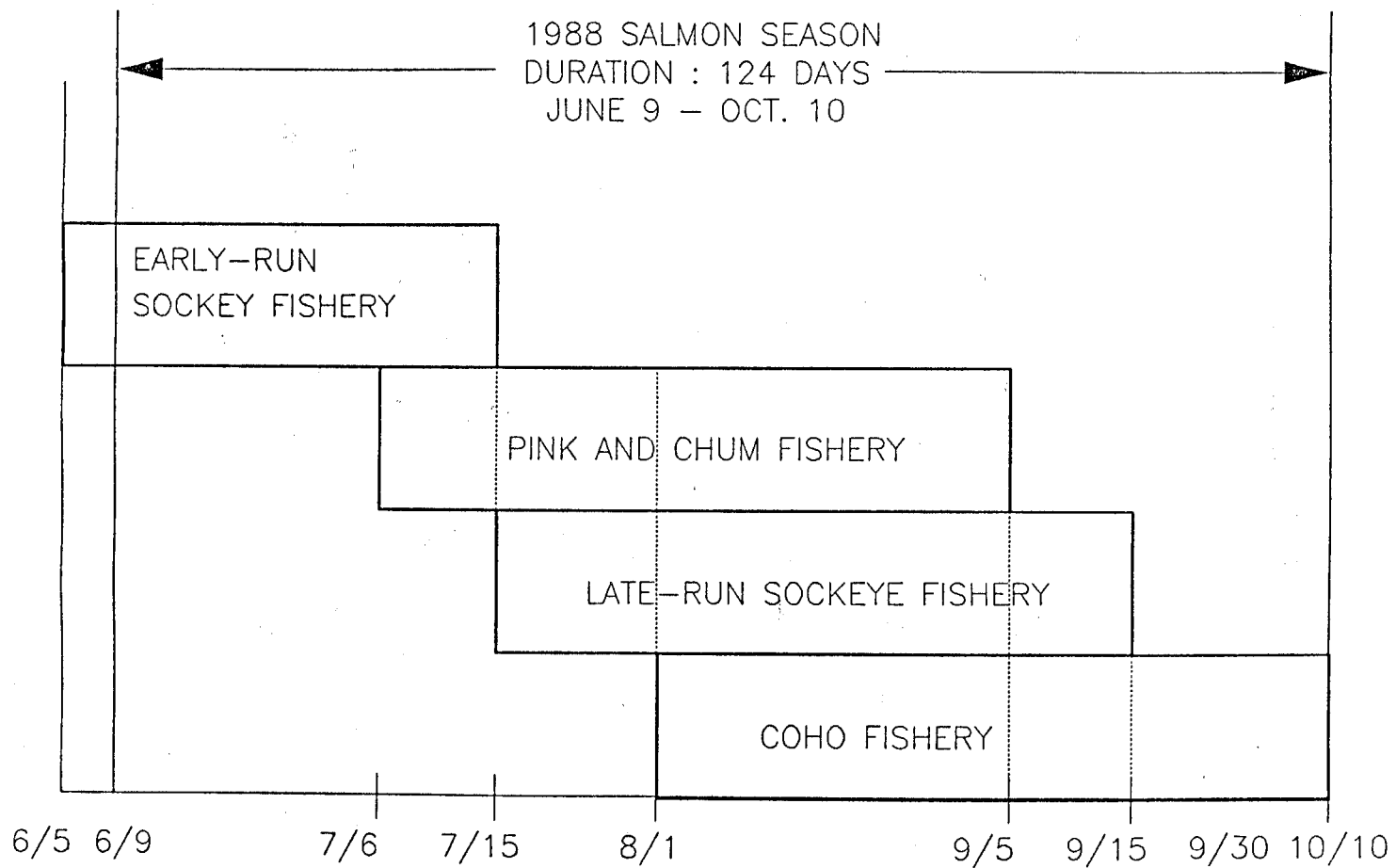


KODIAK AREA SALMON CATCH BY SPECIE

1948 - 1989



KODIAK COMMERCIAL SALMON FISHERIES MANAGEMENT CHRONOLOGY



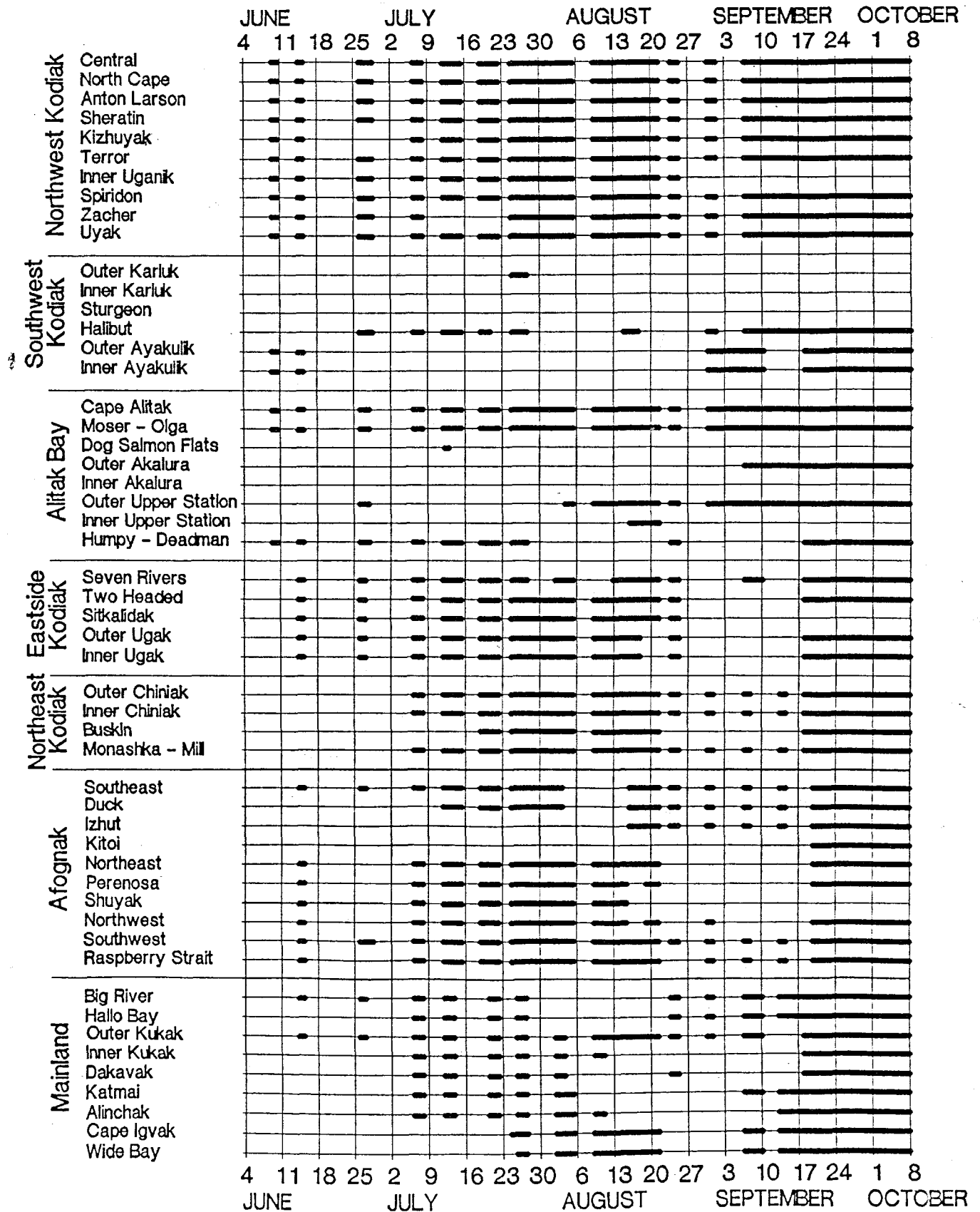
KODIAK MANAGEMENT AREA

- Excerpt from the pre-season 1988 Harvest Strategy for the Commercial Salmon Fishery

- PINKS: Because the projected pink salmon return is expected to be above average in magnitude, fishing periods are expected to average five days in length. However, the length of individual fishing periods is expected to vary from 2-1/2 days to 7 days per week during the period July 6 through August 20. Scenarios on possible fishing time during this time period for those management units unaffected by other specific considerations is listed below:
 - The initial period which begins at 12:00 noon on July 6 will be 2-1/2 days long, ending at 9:00 P.M. on July 8.
 - The second and third periods will expand to approximately 4-1/2 days and will run from 12:00 Noon July 11 through 9:00 P.M. July 15 and from 12:00 Noon July 18 through 9:00 P.M. July 22. An extension in fishing time to the third period will occur if it appears that the actual pink return may exceed the forecasted returns.
 - The fourth period will be approximately 4-1/2 days long and will run from 12:00 Noon July 25 through 9:00 P.M. July 29. However, the peak of the pink salmon harvest should be evident by this period and if pre-season expectations appear to be valid an extension in fishing time to continuous fishing is highly likely.
 - The fifth fishing period, or that time period from approximately 12:00 Noon August 1 through 9:00 P.M. August 5, should be the peak harvest period for Kodiak's pink return providing normal timing occurs. Again, if pre-season expectations appear valid this period will be a continuation of the previous period.
 - The sixth fishing period, or that time period from approximately 12:00 Noon August 8 through 9:00 P.M. August 12 should be a post-peak period. Consequently, for identified weakness in return strength which may require system-specific adjustments in fishing time by management unit and/or closed water sanctuaries, deviations in the pattern of fishing from previous periods will be more evident.
 - The seventh fishing period will be approximately 3-1/2 days long and will run from 12:00 Noon August 15 through 6:00 P.M. August 18 (closing times of all fishing periods after August 16 will be 6:00 P.M. rather than 9:00 P.M. as recommended by the Kodiak Fish and Game Advisory Committee.) This will be an important period requiring a more multi-species management approach in those sections where pinks had been the target species for the previous six periods. Emphasis will be on harvesting excess good quality pink salmon or on achieving minimum pink salmon escapements where applicable, with concern towards the run strength of late-run sockeye salmon and late-run chum salmon.
 - The eighth fishing period will be approximately 3-1/2 days and will run from 12:00 Noon August 22 through 6:00 P.M. August 25. This will essentially be primarily a clean-up period (for both escapement and harvest) for most pink salmon stocks, however some late-run stocks will require continued concern for achieving quality harvest or proper escapement levels. This concern will continue into the first week of September for the few extremely late-run pink salmon systems. Again this period will require a major emphasis on multi-species management; it is a critical management period for late-run sockeye and chum salmon as well as some early-run coho stocks.

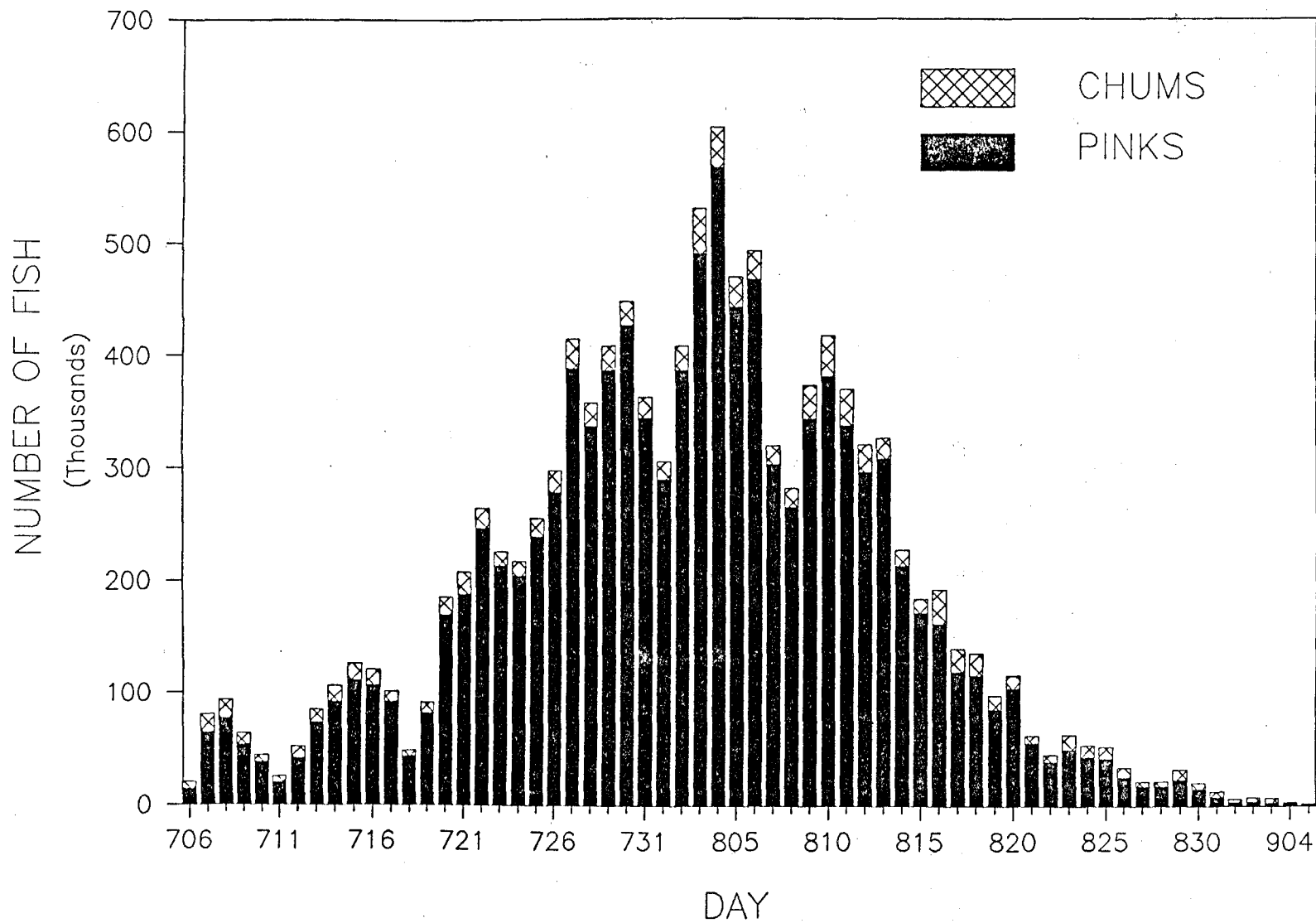
KODIAK SALMON MANAGEMENT AREA 1988 COMMERCIAL FISHING TIME

By District and Section

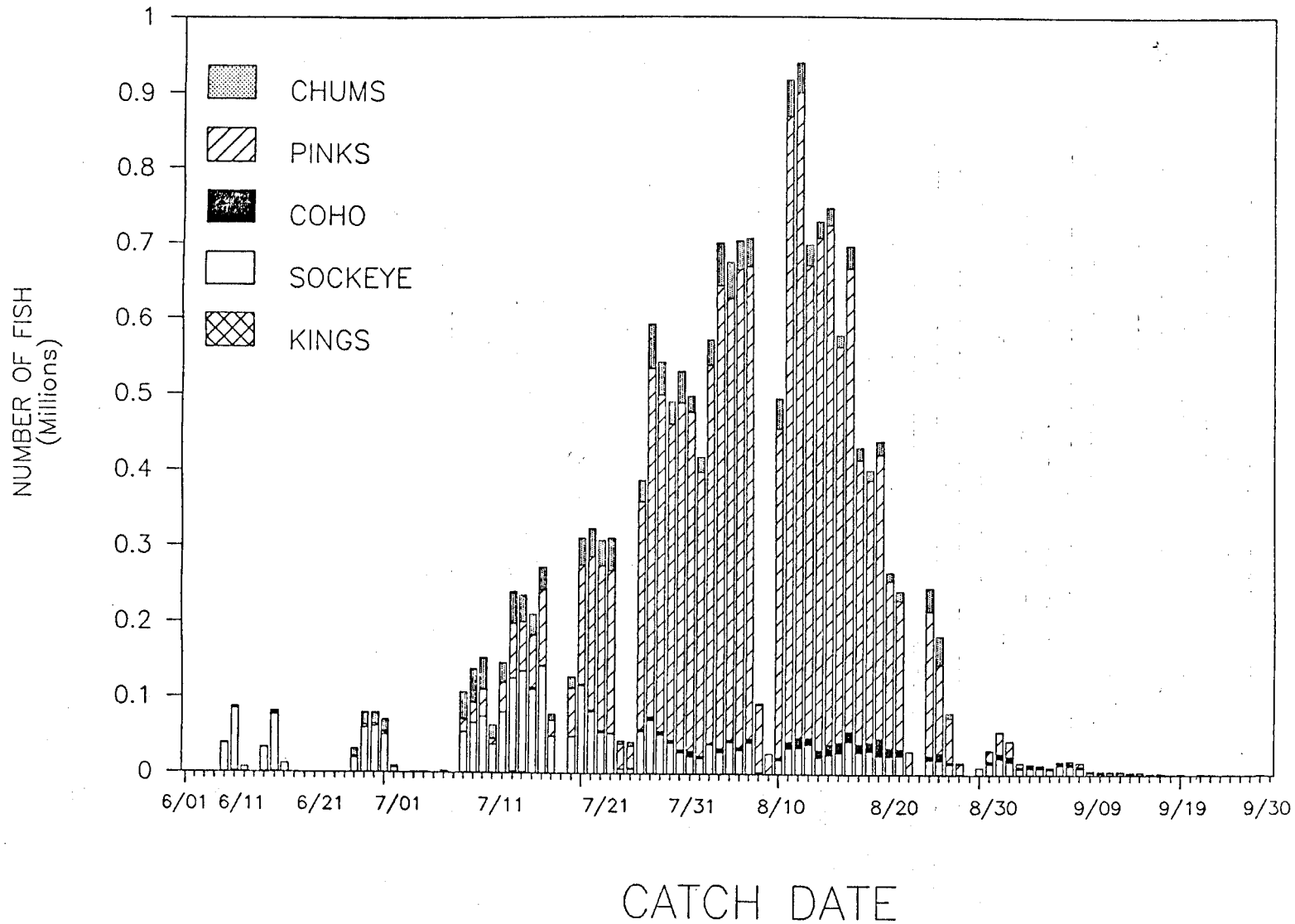


KODIAK MANAGEMENT AREA

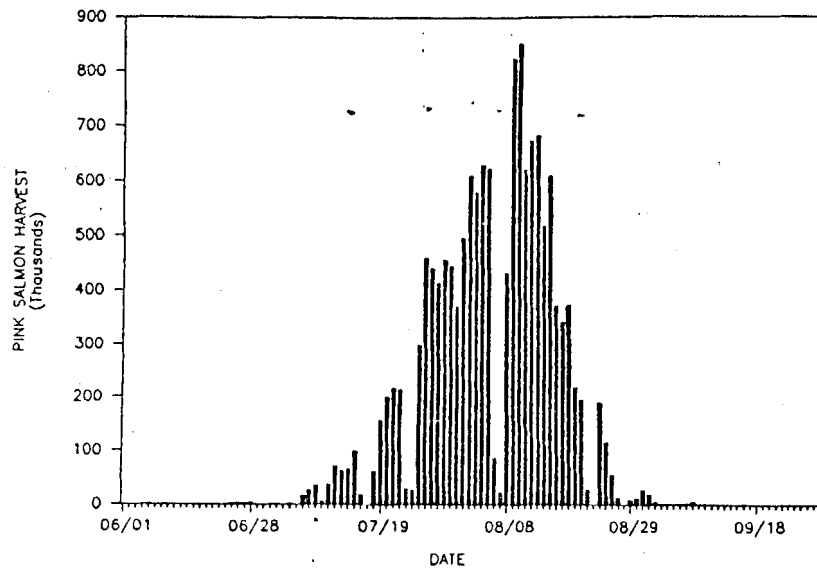
AVG. PINK AND CHUM HARVEST BY DAY: 1970-1988



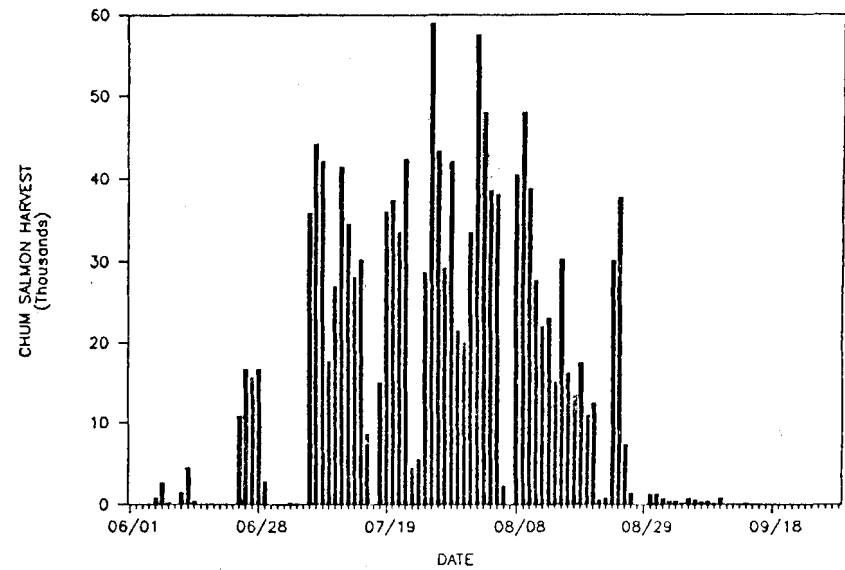
KODIAK MANAGEMENT AREA 1988 SALMON HARVEST BY SPECIES



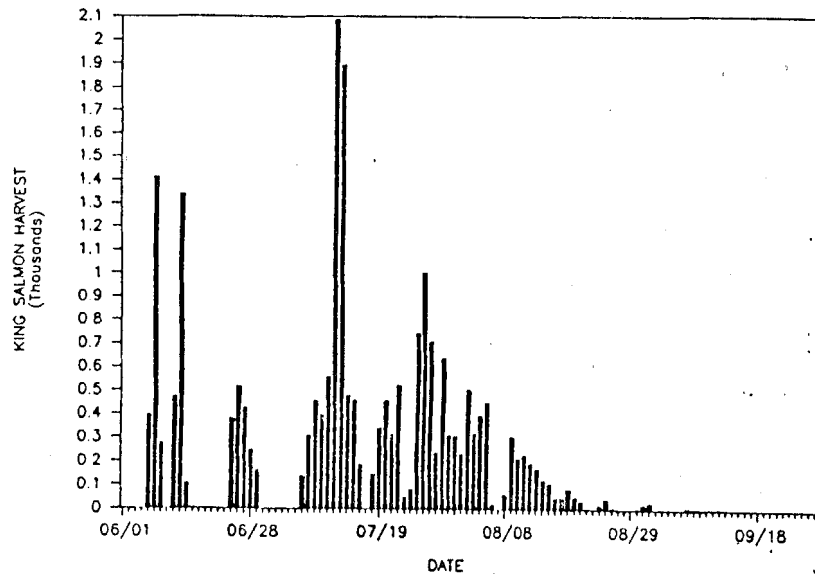
DAILY PINK SALMON HARVEST KODIAK 1988



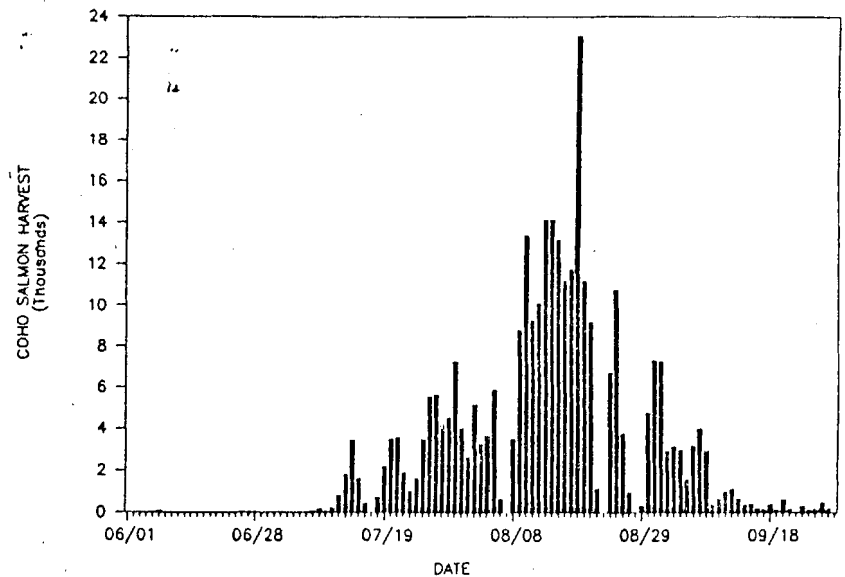
DAILY CHUM SALMON HARVEST KODIAK 1988



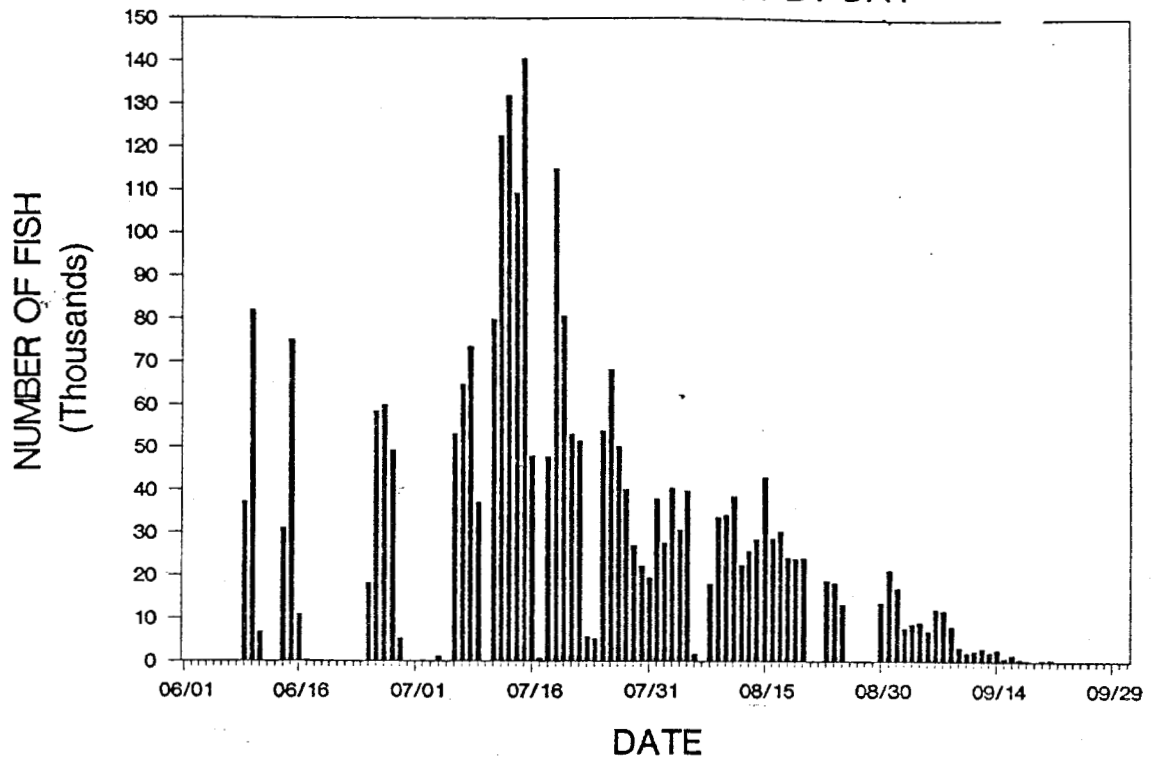
DAILY KING SALMON HARVEST KODIAK 1988



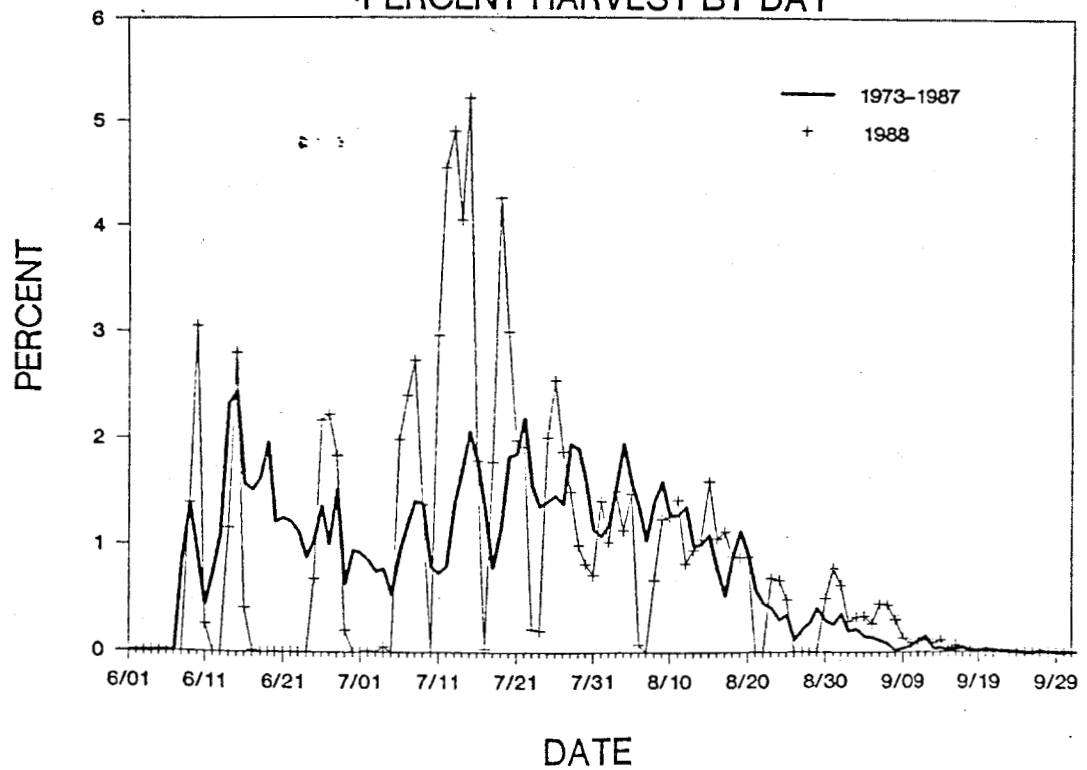
DAILY COHO SALMON HARVEST KODIAK 1988



KODIAK MANAGEMENT AREA 1988 SOCKEYE HARVEST BY DAY



KODIAK MANAGEMENT AREA COMMERCIAL SOCKEYE HARVEST PERCENT HARVEST BY DAY



KODIAK MANAGEMENT AREA
1988 COMMERCIAL SALMON FISHERY
PROJECTED VS. ACTUAL HARVEST BY SPECIES BY FISHERY 1/

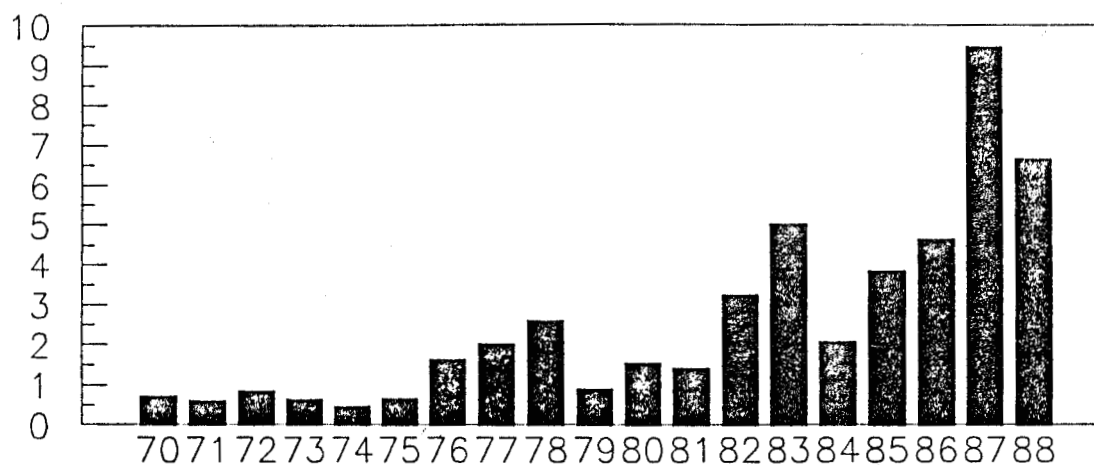
<u>FISHERY</u>	<u>PROJECTED HARVEST / ACTUAL HARVEST</u> (In millions of Fish)	
<u>Early Run Sockeye Salmon Fisheries (6/9-7/15)</u>		
Cape Igvak	.280	.000
Karluk	.225	.150
Ayakulik	.105	.260
Upper Station	.090	.092
Fraser	.125	.296
Minor Systems	.035	.026
Other	.000	.429
Sub-Total	.860	1.253
<u>Pink Salmon Fisheries (7/6-9/5)</u>		
Afognak (Hatchery)	1.250	.307
Afognak (Natural)	.645	2.723
Westside Kodiak	9.206	6.521
Alitak	.753	.386
Eastside/Northend Kodiak	3.000	2.874
Mainland	.316	1.748
Sub-Total	15.250	14.559
<u>Chum Salmon Fisheries (7/6-9/5)</u>		
Afognak (Hatchery)	.000	.001
Afognak (Natural)	.050	.080
Westside Kodiak	.200	.484
Alitak	.040	.093
Eastside/Northend Kodiak	.250	.369
Mainland	.340	.392
Sub-Total	1.000	1.426
<u>Late Run Sockeye Salmon Fisheries (7/16-9/15)</u>		
Cape Igvak	.150	.034
Karluk	.325	.236
Ayakulik	.050	.150
Upper Station	.400	.750
Fraser	-	-
Minor Systems	.015	.005
Other	.000	.271
Sub-Total	.940	1.446
<u>Coho Salmon Fisheries (6/9-10/15)</u>		
Afognak	.040	.079
Westside	.055	.091
Alitak	.020	.030
Eastside/Northend Kodiak	.015	.048
Mainland	.020	.055
Sub-Total	.150	.303
GRAND TOTAL (6/9-10/15)	18.204	18.986

1/ For both early and late run sockeye, the fishery labeled "other" refers to the 1988 estimated total Cook Inlet sockeye interception in the Kodiak Area (approximately 700,000 sockeye). This estimate was derived using data presented in Research Biologist Bruce Barrett's Regional Data Report on Shelikof Strait Sockeye Interception, R.D.R. 4K88-6, and using estimates made by the Kodiak Finfish Management staff of additional Cook Inlet bound sockeye harvested from portions of the Kodiak Management Area not covered by Barrett's report. This estimate was based upon a cursory review of historical Kodiak sockeye harvest data on run timing, average weights, differential production for systems both within and outside of the Kodiak Area, and of trends in fishing patterns.

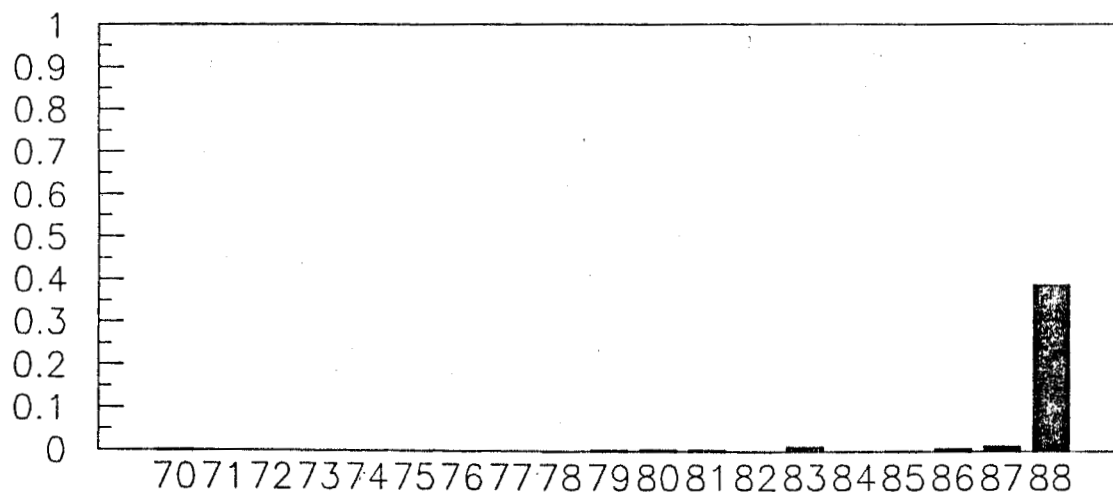
SOCKEYE HARVEST COMPARISON BETWEEN UPPER COOK INLET AND PORTIONS OF THE KODIAK AREA

UPPER COOK INLET MANAGEMENT AREA HISTORICAL SOCKEYE HARVEST

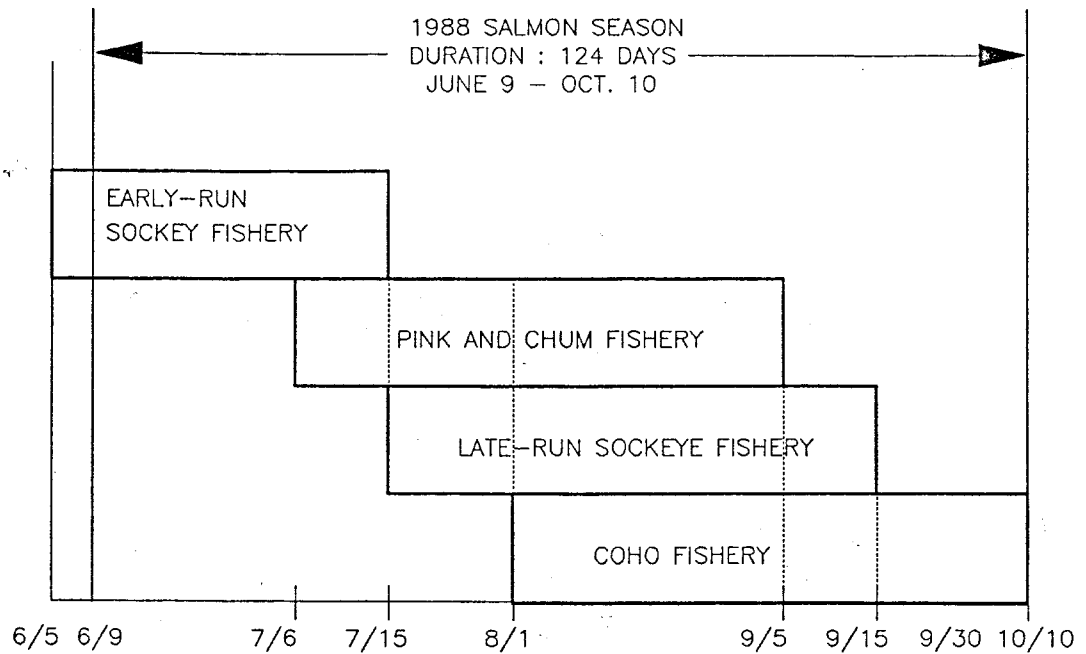
MILLIONS OF FISH



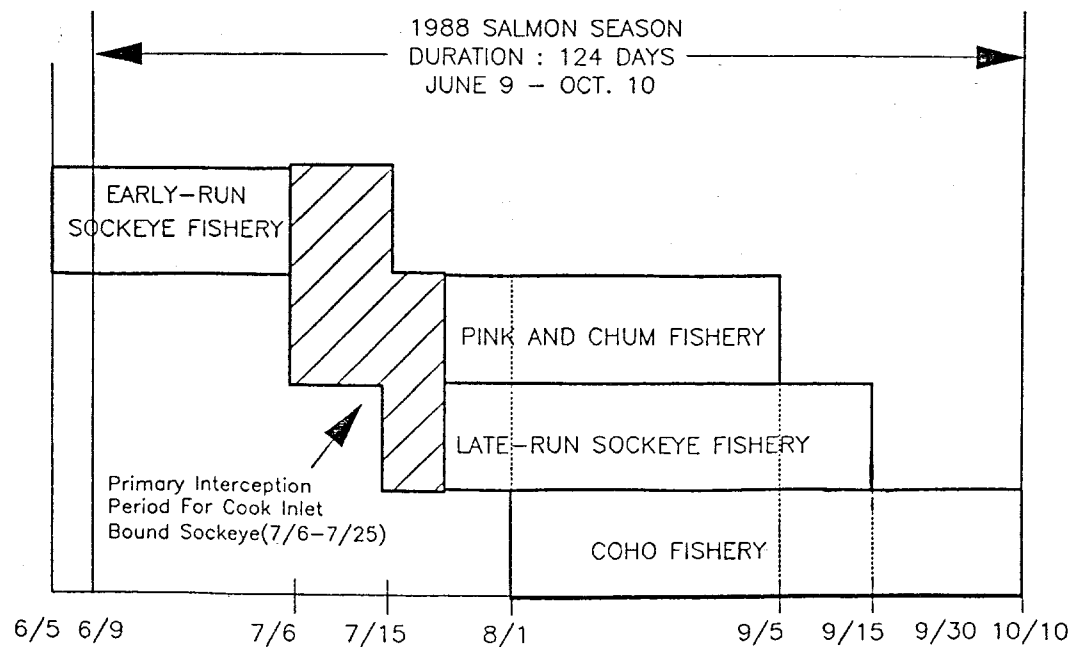
SHELIKOF STRAITS INTERCEPT AREA HISTORICAL SOCKEYE HARVEST (JULY 6 – JULY 25)



KODIAK COMMERCIAL SALMON FISHERIES MANAGEMENT CHRONOLOGY



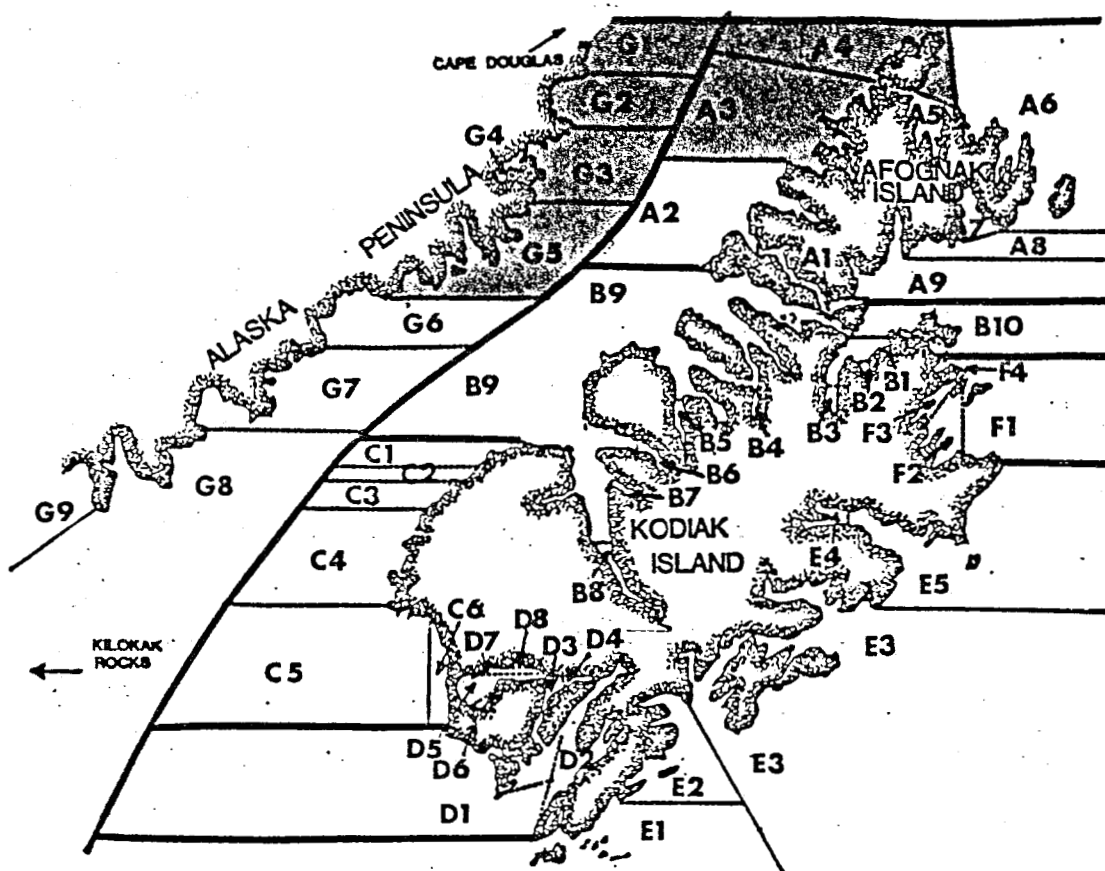
KODIAK COMMERCIAL SALMON FISHERIES MANAGEMENT CHRONOLOGY



SHELIKOF STRAIT INTERCEPT AREA For Cook Inlet Bound Sockeye

Designated by the Kodiak Area ADF&G Finfish Management Staff
Based Upon 1988 In-Season Harvest/Effort Data

KODIAK MANAGEMENT AREA DISTRICTS/SECTIONS



KODIAK MANAGEMENT AREA DISTRICTS/SECTIONS

A. AFOGNAK DISTRICT

A1 RASPBERRY STRAITS S.
A2 SOUTHWEST AFOG. S.
A3 NORTHWEST AFOG. S.
A4 KILOKAK S.
A5 KILOKAK BAY S.
A6 NORTHEAST AFOG. S.
A7 KILOKAK BAY S.
A8 KILOKAK BAY S.
A9 DUCK BAY S.

C. SOUTHWEST KODIAK D.

C1 OUT. KARLUK S.
C2 N. KARLUK S.
C3 STURGEON S.
C4 HALEUT BAY S.
C5 OUT. AYAKLUK S.
C6 N. AYAKLUK S.

E. EASTSIDE KODIAK D.

E1 7-RIVERS S.
E2 2-HEADED S.
E3 SITKALDIK S.
E4 N. UGAK BAY S.
E5 OUT. UGAK S.

F. NORTHEAST KODIAK D.

F1 OUT. CHINAK B. S.
F2 N. CHINAK B. S.
F3 BUSKIN RIVER S.
F4 MONASHKAMILL B. S.

B. NORTHWEST KODIAK D.

B1 ANTON LARSON BAY S.
B2 SHERATIN BAY S.
B3 KIZUYAK BAY S.
B4 TERROR BAY S.
B5 N. UGAK BAY S.
B6 SHERIDON BAY S.
B7 ZACHAR BAY S.
B8 UYAK BAY S.
B9 CENTRAL S.
B10 NORTH CAPE S.

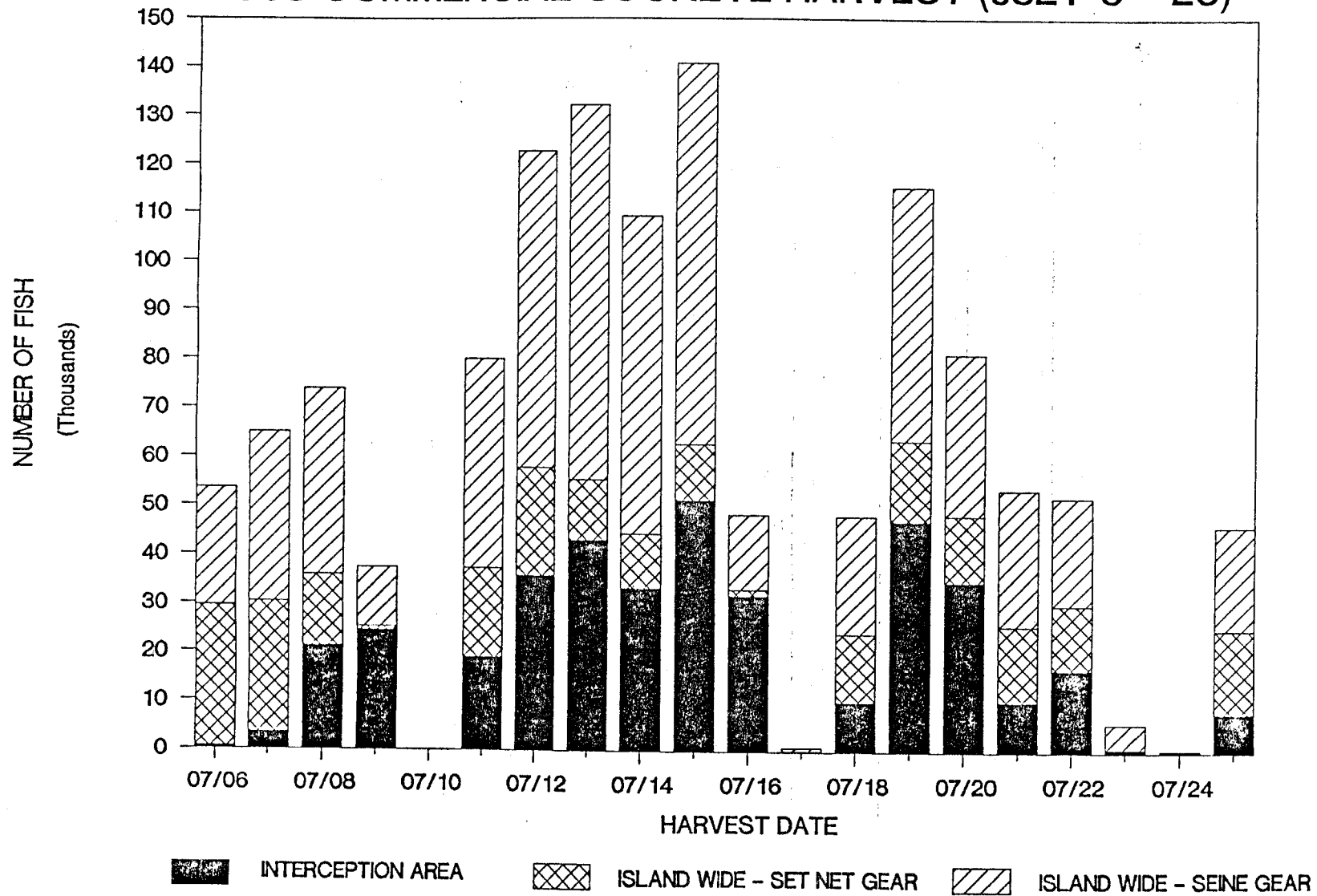
D. ALITAK BAY D.

D1 C. ALITAK S.
D2 HUMPY-DEAD S.
D3 MOSER-OLGA B.
D4 DOG SAL. FLATS S.
D5 OUT. UP. STAT. S.
D6 N. UP. STAT. S.
D7 OUT. AKALLRA S.
D8 N. AKALLRA S.

G. MAINLAND DISTRICT

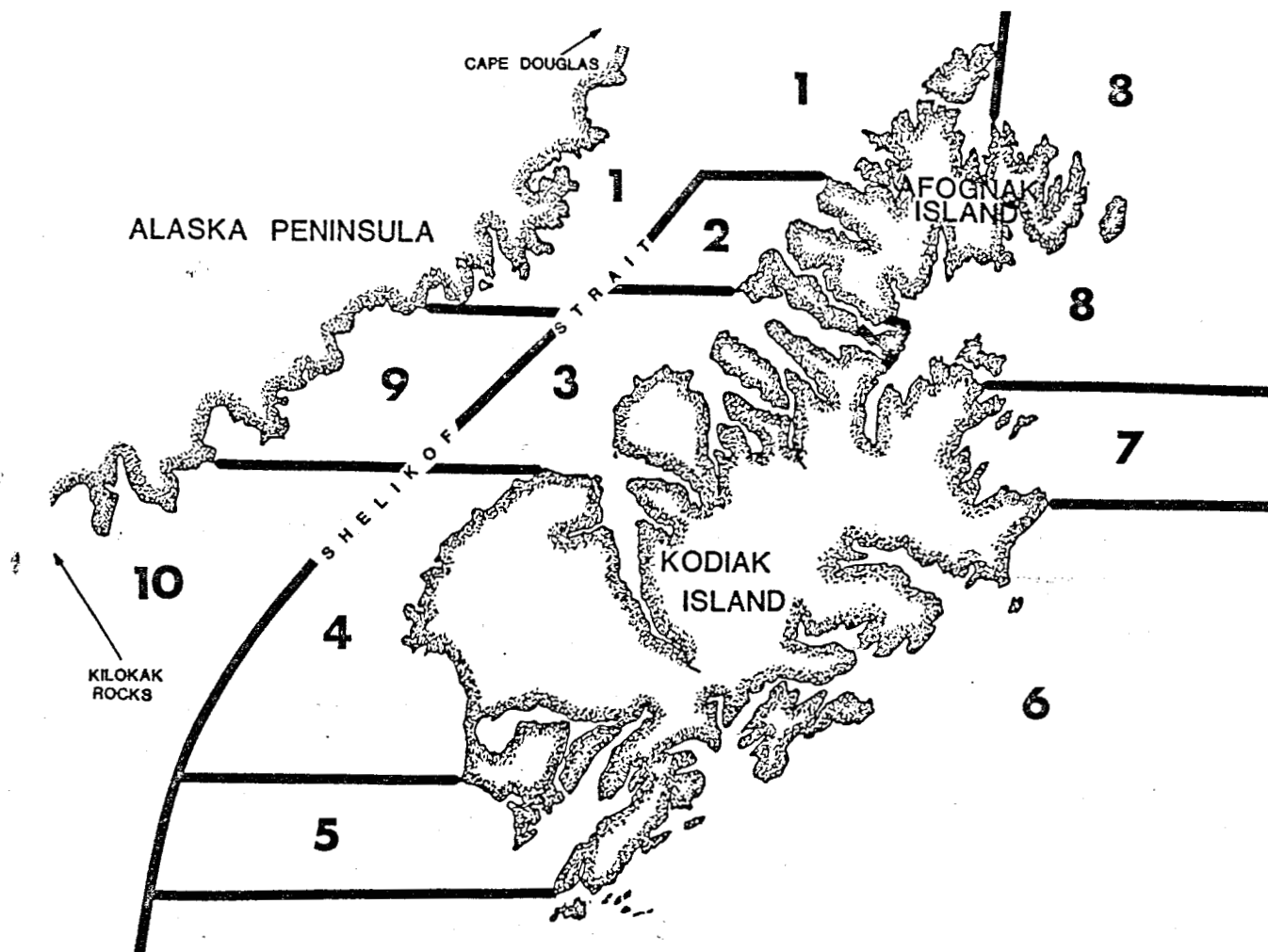
G1 BO RIVER S.
G2 HALLO BAY S.
G3 OUT. KUKAK S.
G4 N. KUKAK S.
G5 KAYAK S.
G6 KATIDU S.
G7 ALINCHAK S.
G8 CAPE KIVAK S.
G9 WIDE BAY S.

KODIAK MANAGEMENT AREA 1988 COMMERCIAL SOCKEYE HARVEST (JULY 6 - 25)

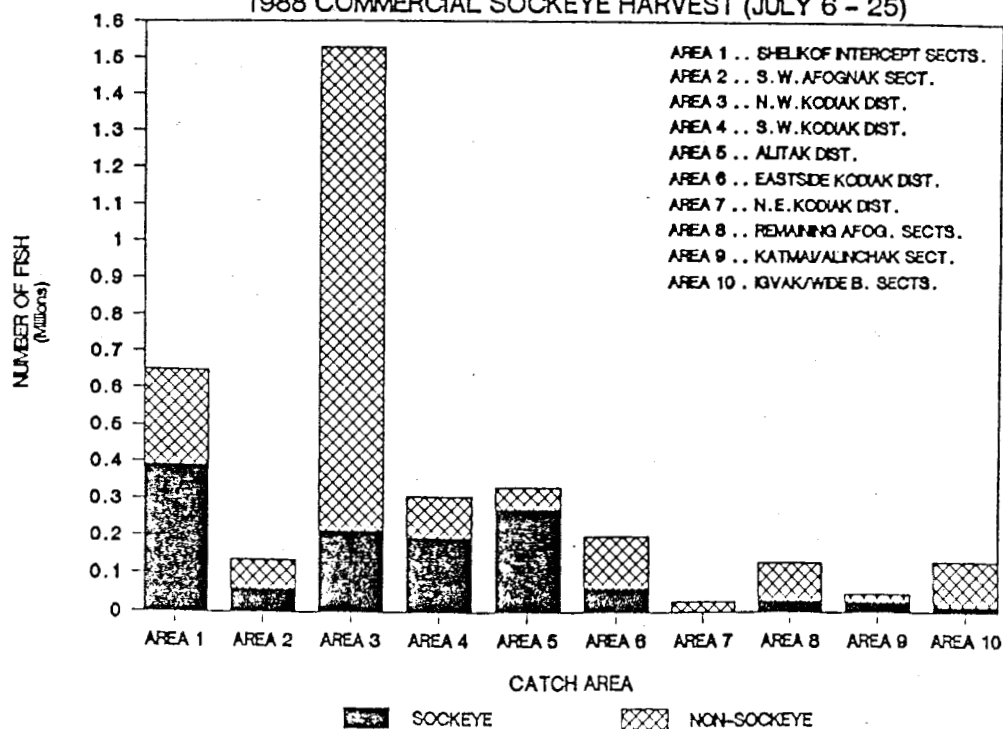


KODIAK MANAGEMENT AREA

GEOGRAPHICALLY ASSOCIATED MANAGEMENT UNITS



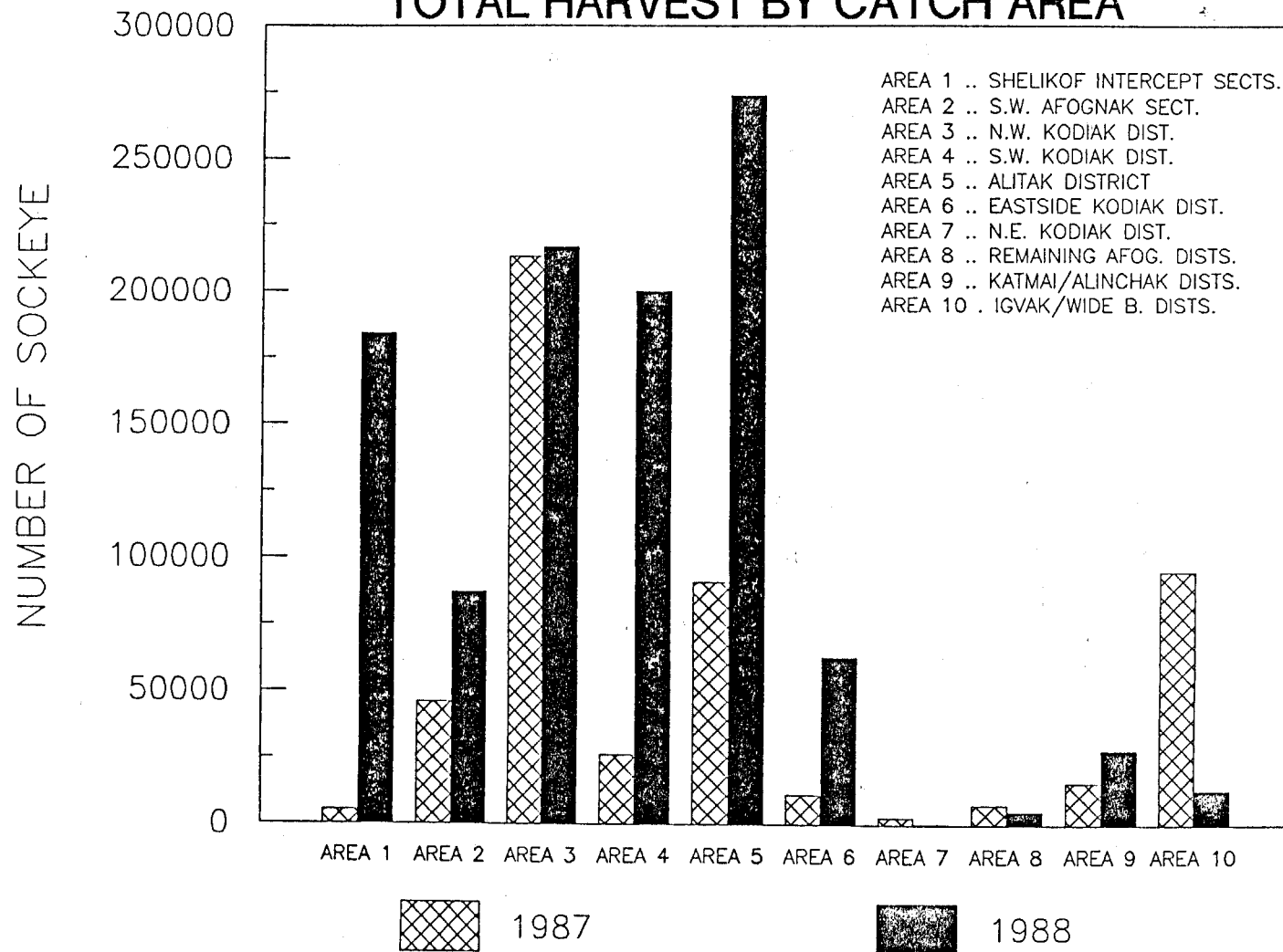
KODIAK MANAGEMENT AREA
1988 COMMERCIAL SOCKEYE HARVEST (JULY 6 - 25)



KODIAK MANAGEMENT AREA

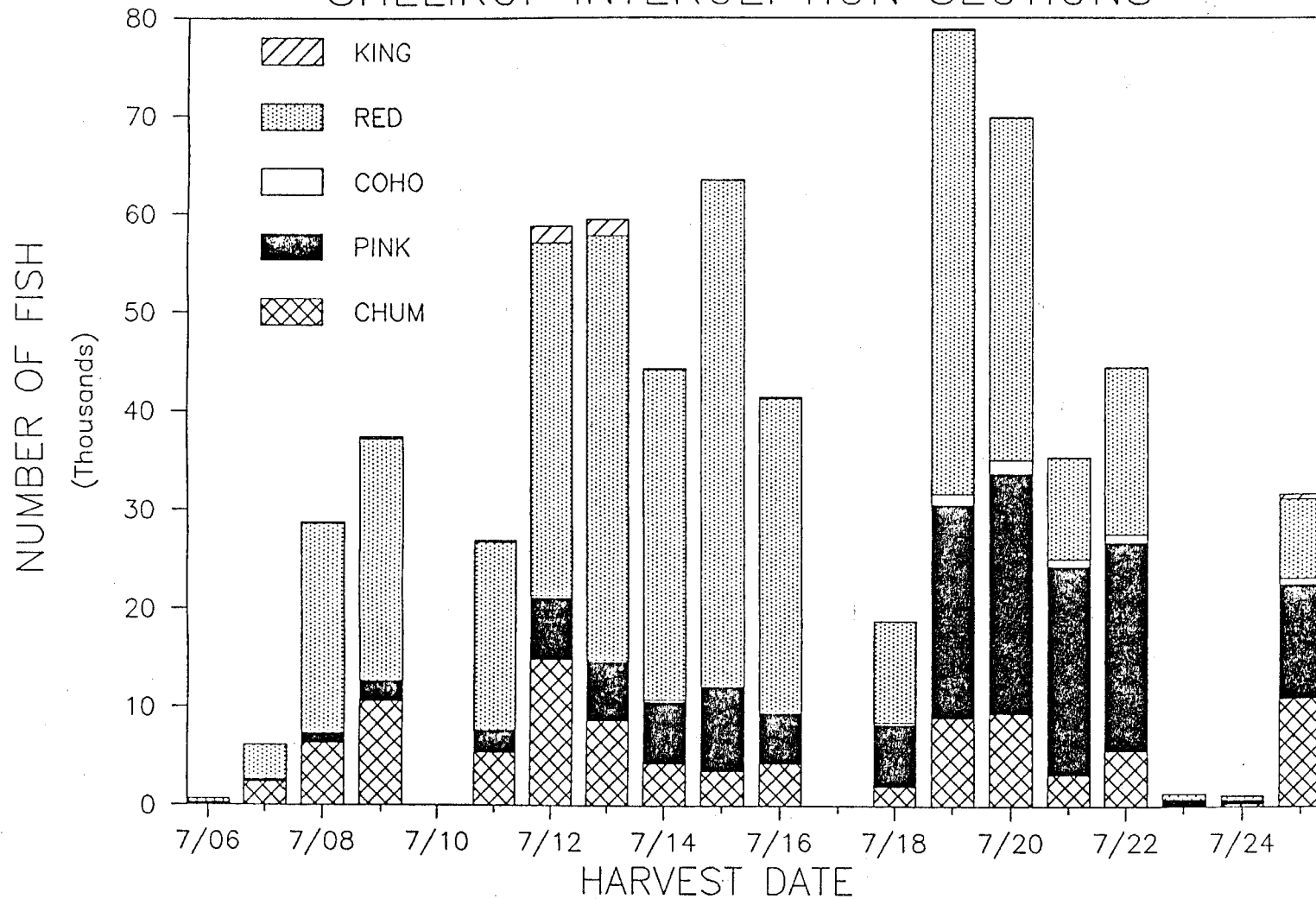
1987-88 COMMERCIAL SOCKEYE HARVEST (JULY 6-25)

TOTAL HARVEST BY CATCH AREA



KODIAK SALMON MANAGEMENT AREA

1988 SALMON HARVEST BY SPECIES (JULY 6 - 25)
SHELIKOF INTERCEPTION SECTIONS^{1]}

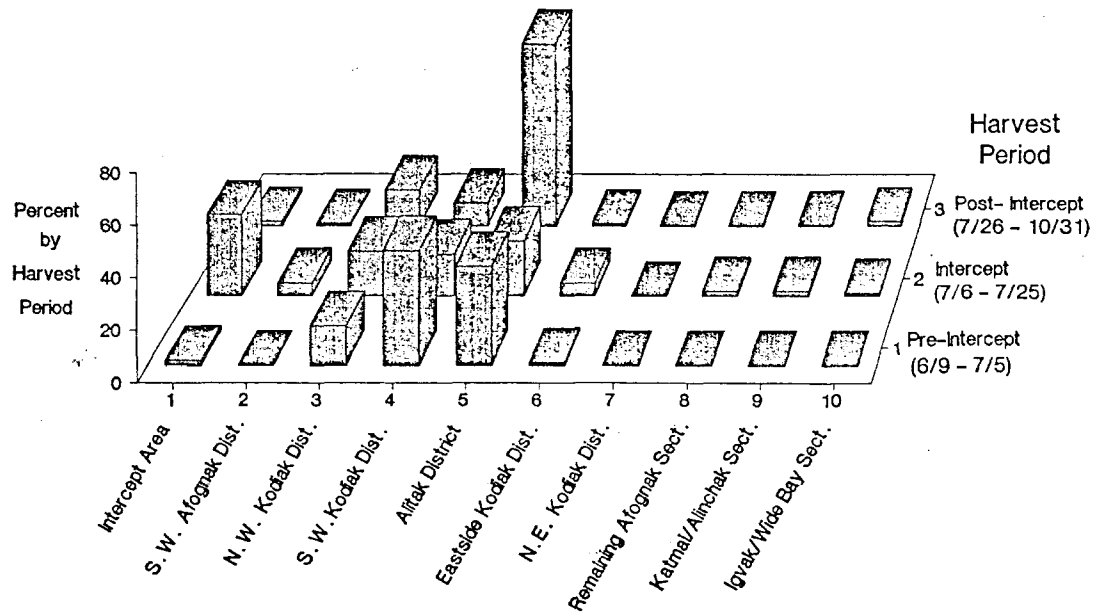


^{1]} Shelikof Interception Sections include: N.W. Afognak, Shuyak, Dakavak, Inner and Outer Kukak, Hallo Bay, and Big River Sections

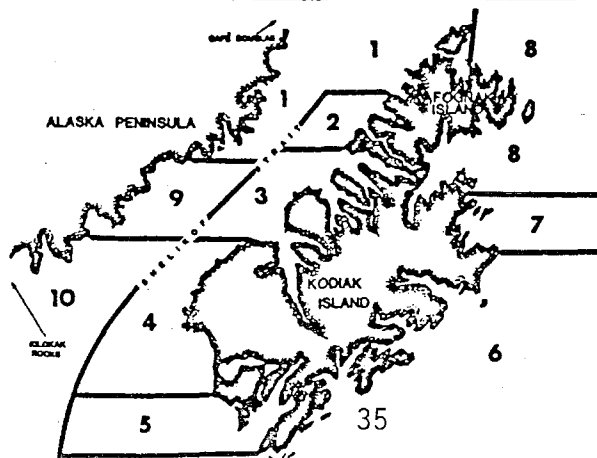
KODIAK MANAGEMENT AREA

1988 Commercial Sockeye Harvest

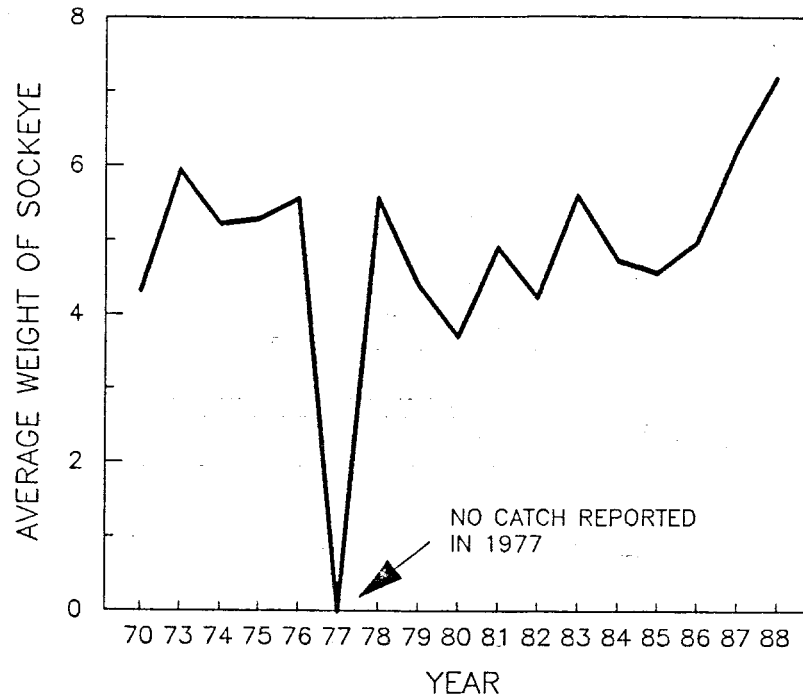
By Geographically Associated Management Units



HARVEST LOCATION			HARVEST PERIOD			Total	
Area Name	Pre-Intercept (6/9 - 7/5)		Intercept (7/6 - 7/25)		Post-Intercept (7/26 - 10/31)		
	No.s	%	No.s	%	No.s %		
1 Intercept Area %	8,394 (.02)	(.02)	391,919 (.31)	(.92)	23,825 (.02)	(.06) - (.16)	424,129 (.16)
2 S.W. Afognak Dist. %	295 ($<.01$)	-	61,417 (.05)	(.87)	9,064 (.01)	(.13) - (.02)	70,767 (.02)
3 N.W. Kodiak Dist. %	66,604 (.15)	(.16)	216,575 (.17)	(.52)	134,951 (.14)	(.32)	418,130 (.16)
4 S.W. Kodiak Dist. %	193,470 (.44)	(.40)	198,662 (.16)	(.41)	89,484 (.09)	(.19)	481,616 (.18)
5 Alitak District %	165,404 (.38)	(.15)	273,864 (.21)	(.24)	684,605 (.70)	(.61)	1,123,873 (.42)
6 Eastside Kodiak Dist. %	1,942 (.01)	(.03)	62,625 (.05)	(.83)	11,003 (.01)	(.15)	75,570 (.03)
7 N.E. Kodiak Dist. %	0 (.00)	(.00)	263 ($<.01$)	($<.01$)	468 ($<.01$)	($<.01$)	731 ($<.01$)
8 Remaining Afog. Sects. %	0 (.00)	(.00)	30,754 (.02)	(.91)	2,905 ($<.01$)	(.09)	33,659 (.01)
9 Katmai/Alinichak Sects. %	0 (.00)	(.00)	27,936 (.02)	(.98)	652 ($<.01$)	(.02)	28,588 (.01)
10 Igvak/Wide Bay Sects. %	0 (.00)	(.00)	13,150 (.01)	(.38)	21,451 (.02)	(.62)	34,601 (.01)
TOTAL (% of Total)	436,091 (.16)		1,277,165 (.48)		978,408 (.36)		2,691,664 (1.00)

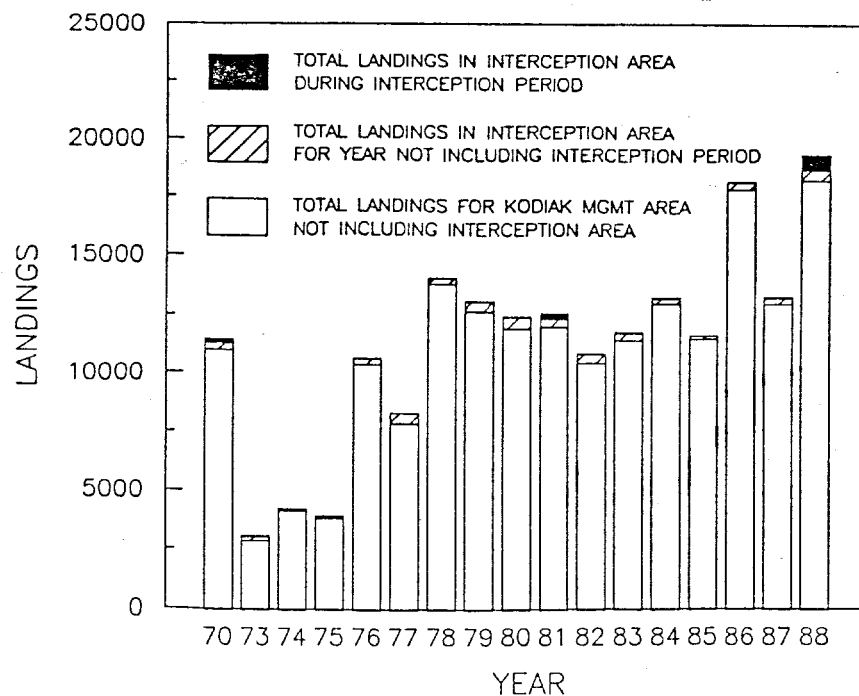


**KODIAK MANAGEMENT AREA
AVERAGE WEIGHT OF SOCKEYE HARVESTED IN THE INTERCEPTION
AREA DURING THE INTERCEPTION PERIOD (7/6-7/25)**



AVGWT

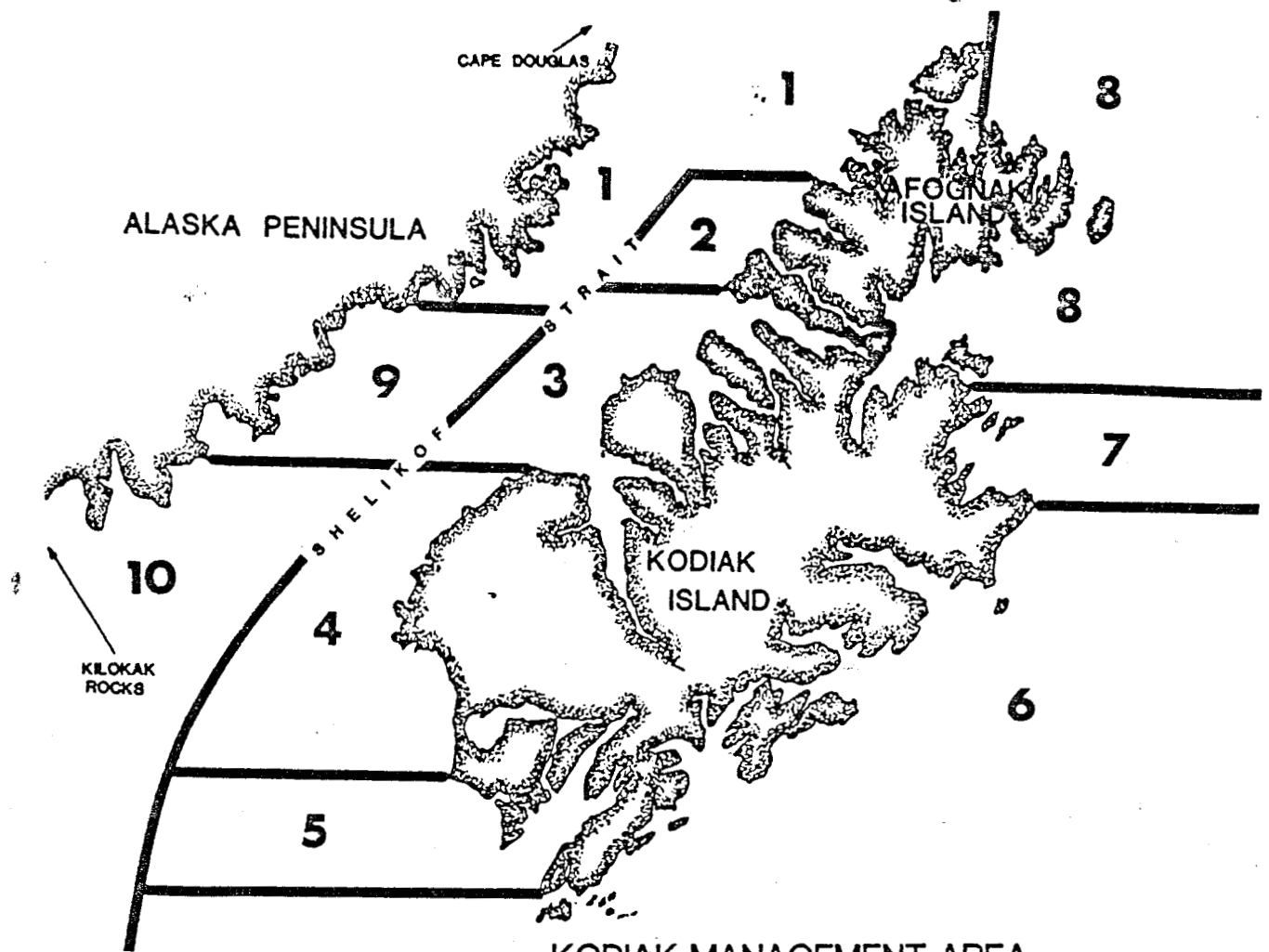
**KODIAK MANAGEMENT AREA COMMERCIAL SALMON FISHERY
COMPARISONS BETWEEN NUMBER OF LANDINGS INTERCEPT AREA
vs. NON-INTERCEPT AREA AND INTERCEPT PERIOD
vs. NON-INTERCEPT PERIOD**



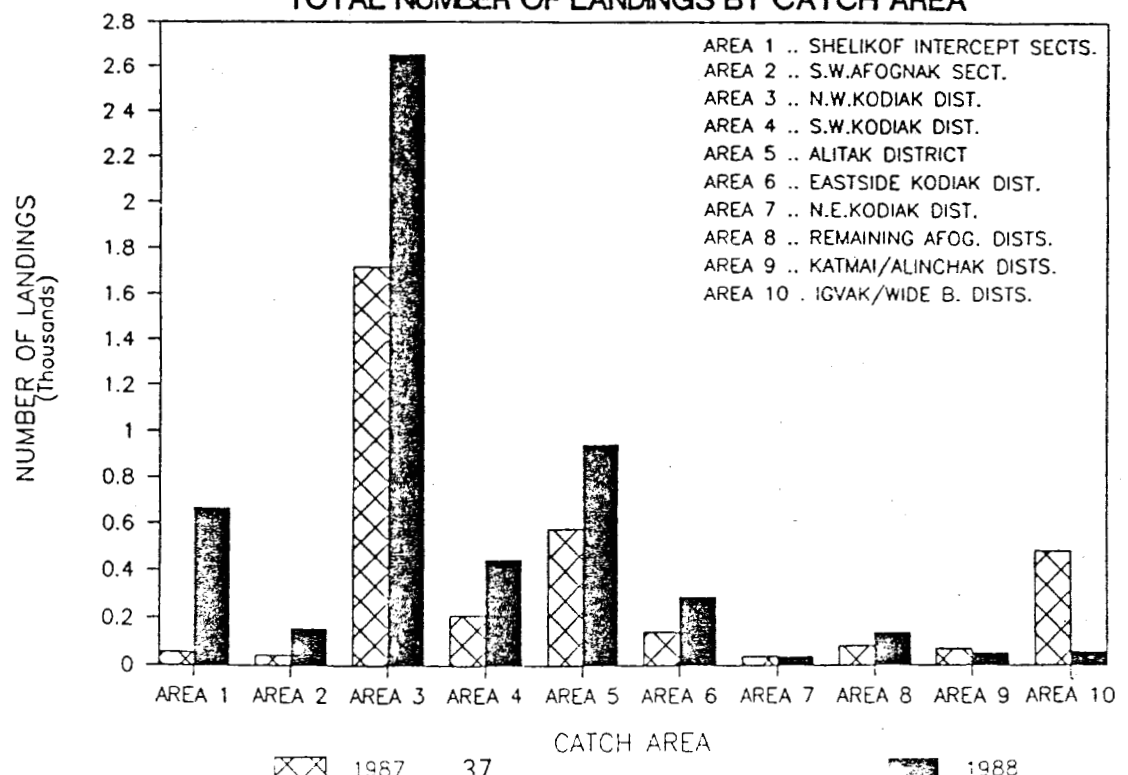
LANDINGS

KODIAK MANAGEMENT AREA

GEOGRAPHICALLY ASSOCIATED MANAGEMENT UNITS

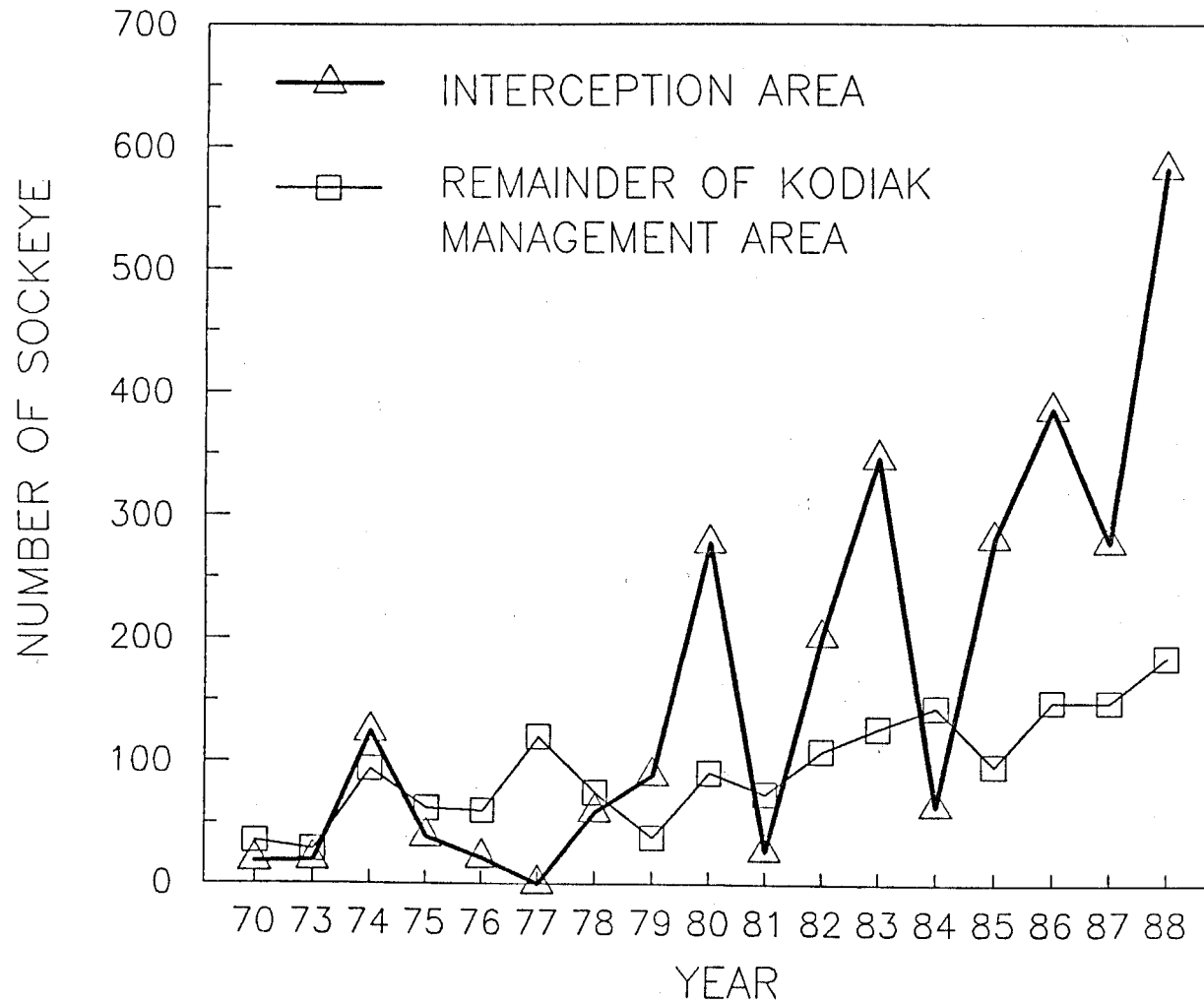


KODIAK MANAGEMENT AREA
1987-88 COMMERCIAL SOCKEYE HARVEST (JULY 6 - 25)
TOTAL NUMBER OF LANDINGS BY CATCH AREA



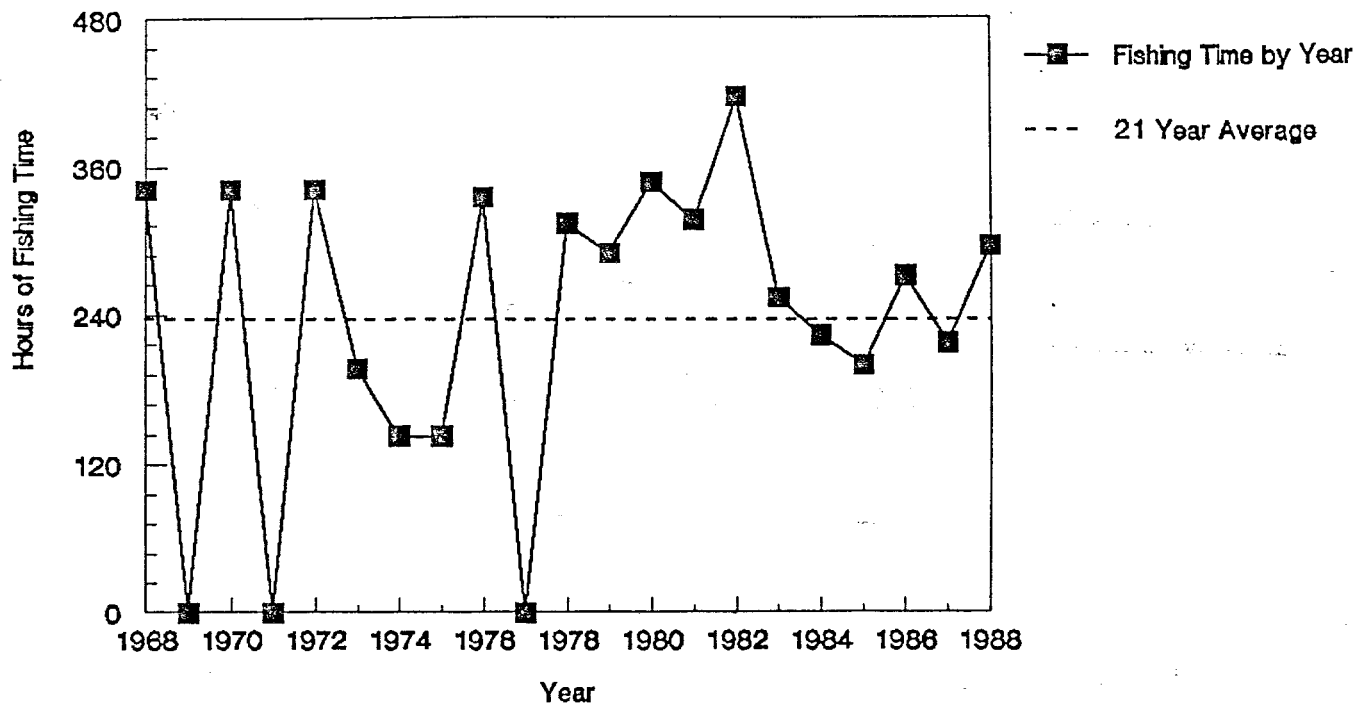
KODIAK MANAGEMENT AREA

AVERAGE SOCKEYE HARVEST PER LANDING
DURING THE INTERCEPTION PERIOD (7/6 - 7/25)
1970 - 1988

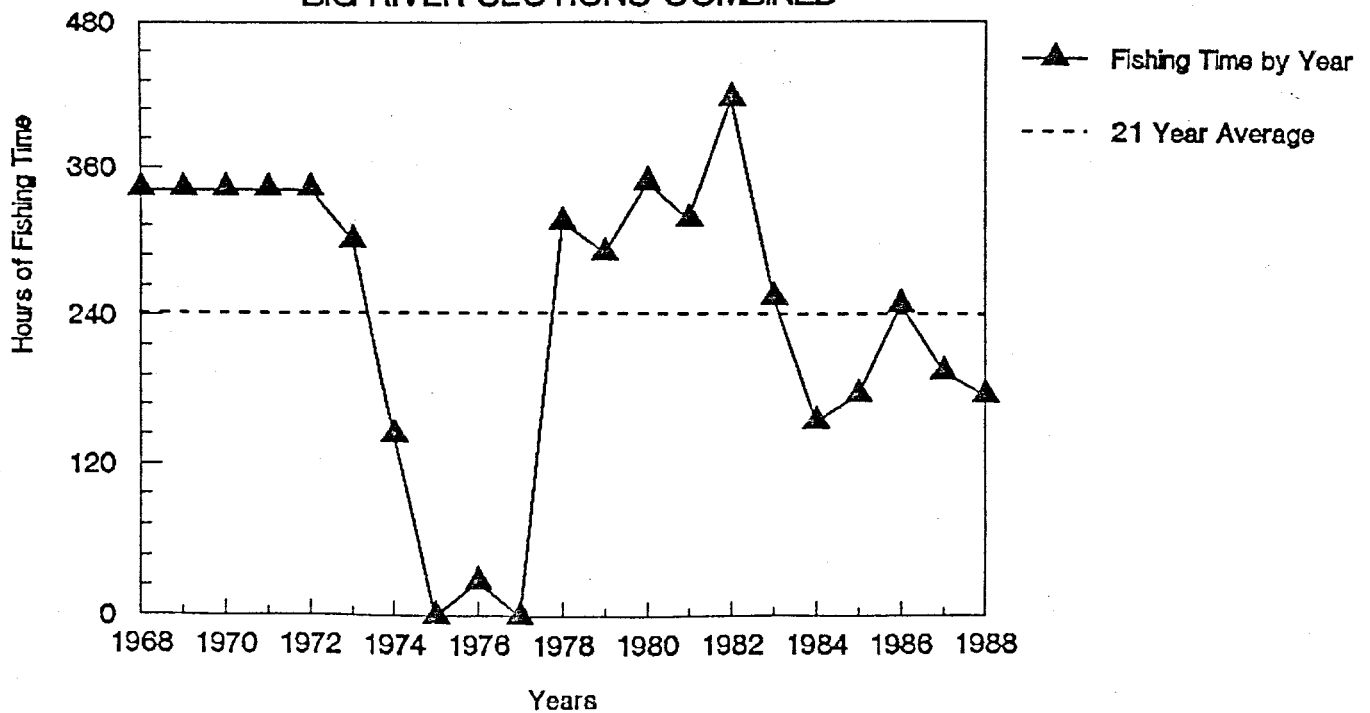


KODIAK MANAGEMENT AREA 1988 COMMERCIAL FISHING TIME (JULY 6-25)

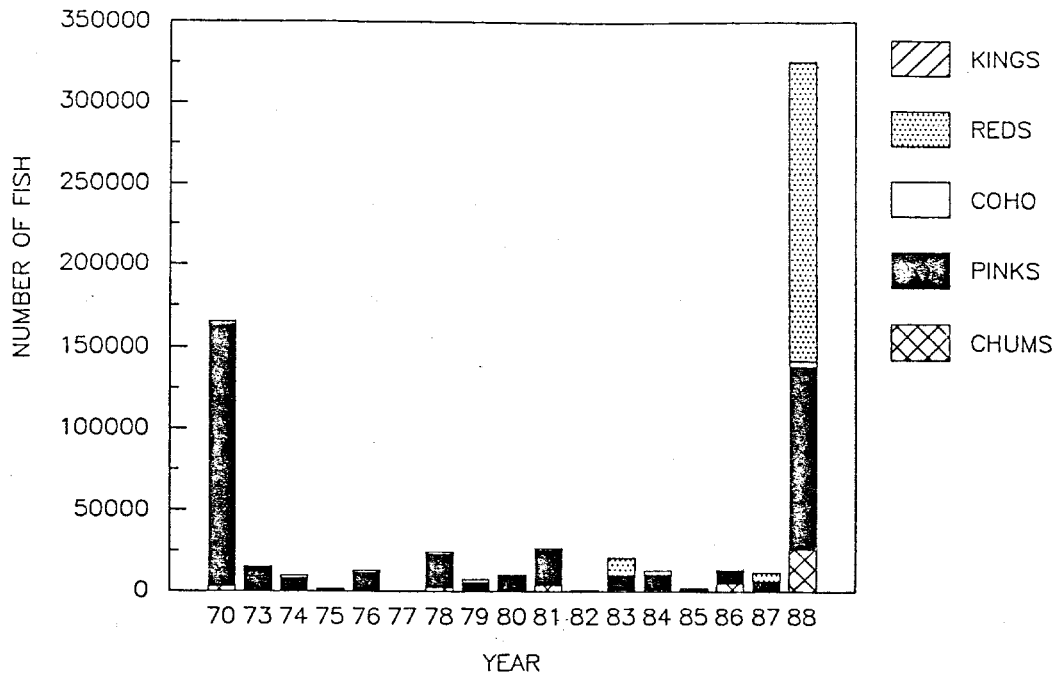
N.W. AFOGNAK & SHUYAK SECTIONS COMBINED



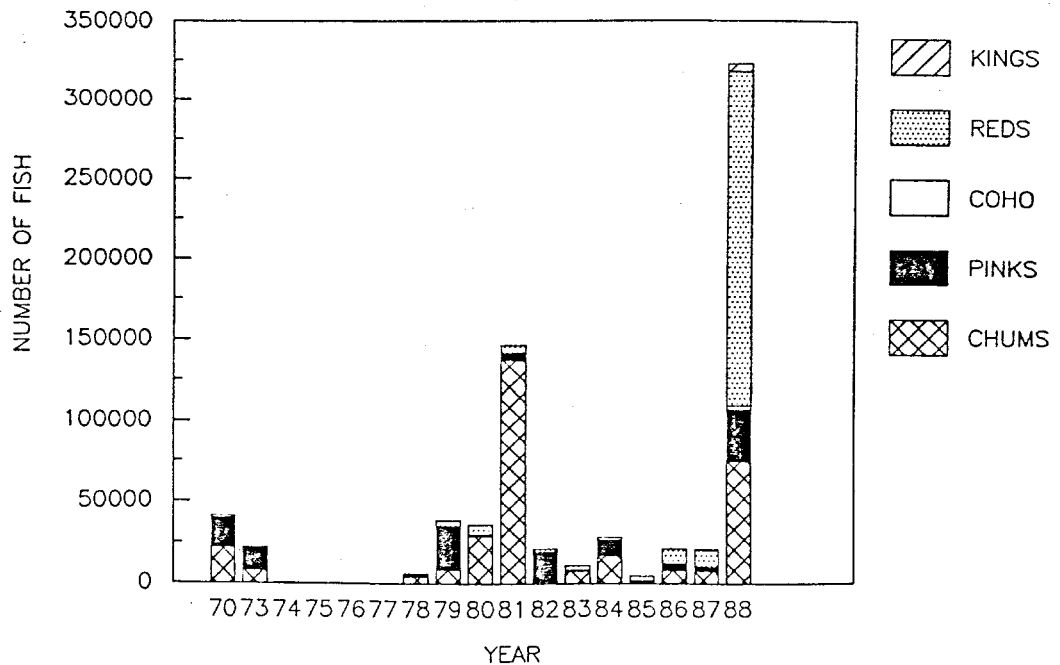
DAKAVAK, IN. & OUT. KUKAK, HALLO BAY, AND BIG RIVER SECTIONS COMBINED



**KODIAK COMMERCIAL SALMON HARVEST (JULY 6 - JULY 25)
BY SPECIES ALL GEAR COMBINED
N. W. AFOGNAK AND SHUYAK SECTIONS COMBINED**



**KODIAK COMMERCIAL SALMON HARVEST (JULY 6 - JULY 25)
BY SPECIES ALL GEAR COMBINED
DAKAVAK, IN. & OUT. KUKAK, HALLO BAY, BIG RIVER SECTIONS COMBINED**



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